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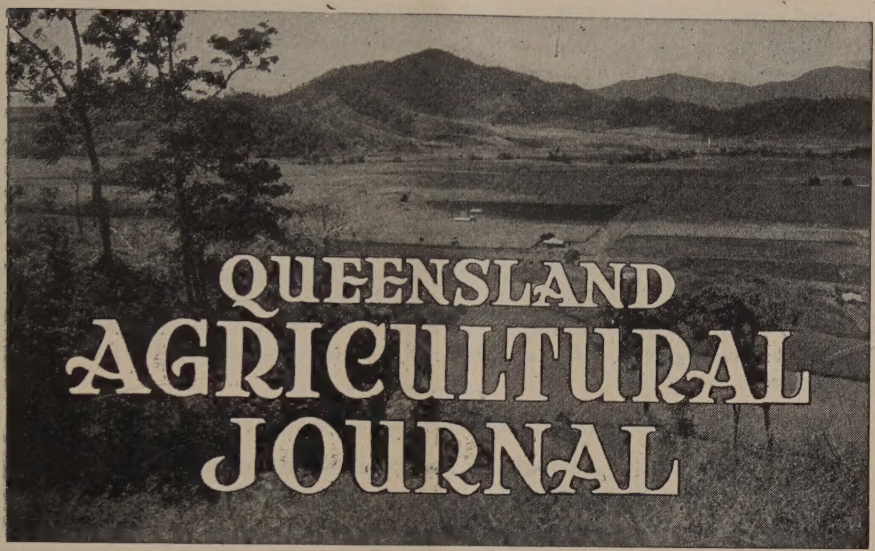

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Event and Comment.

Butter for Britain—Four-year Contract for Australian Producers.

UNDER a long-term arrangement with the British Government, Australian producers are now assured of markets for meat and dairy products at good prices for four years. This arrangement will continue until 1948, and its terms provide that during the period of its currency Britain will take the whole of Australia's exportable surplus of dairy produce and other specified foodstuffs. This notable contract, therefore, ensures for the Australian producer a guaranteed market and a guaranteed price for those foodstuffs. The exportable surplus will be declared after providing for Australian Services and civil population, and for British, United States and other Allied personnel based on Australia, as well as for other markets as agreed to mutually by the Commonwealth and British Governments.

For Australian producers, this four-year contract constitutes a marketing landmark; it provides an assured outlet for all our meat and dairy products on a price basis which ensures long-range stability for the industries concerned. As Britain was our best overseas customer before the war, so Britain continues as one of our best wartime customers. Naturally, the chief reason for this arrangement is the impetus it is expected to give to an increased output of primary products needed so urgently to feed a hungry world.

One of the present pressing national needs is a big increase in dairy production. With the knowledge that every pound of butter, every pound of cheese and every container of processed milk they can produce will be sold at a satisfactory price, Queensland dairy farmers will realise that their industry will be protected on the one hand, and, on

the other, that they will add to their already splendid contribution towards the winning of the war. The need is urgent; Commonwealth commitments must be met; and our contribution to the food needs of the United Nations must be continued.

The arrangement between the two Governments concerned will operate for a period of four years as from 1st October, 1944, to 30th September, 1948, for meat; and from 1st July, 1944, to 30th June, 1948, for dairy produce. Briefly, the arrangement is based on the desire of the British Government that Australia should maintain and increase, if possible, the production of meat and dairy foodstuffs in order to ensure supplies which are, and will continue to be, urgently needed; and on the desire of the Commonwealth Government to assist to this end by making available for export to Britain during the period of this arrangement, the surplus of the products mentioned after provision is made for—

Home requirements, including Australian Services;

Supplies which Australia is required to make available to British, United States and other Allied personnel based on Australia;

Quantity which the Australian Government may provide relief requirements after consultation and agreement with the British Government; and

Quantities which the two Governments mutually agree shall be supplied to other markets.

The important point for Australian producers is that they are now assured of markets for their meat and dairy products for the four years during which the arrangement will operate.

The surplus production of all classes of meat—beef, mutton, lamb, pigmeats and offals come within the scope of the arrangement, but in the case of pigmeats further discussions will take place, well before the beginning of the last two years of the arrangement, to determine the maximum quantities which Britain will take during those two years, namely, from 1st October, 1946, to 30th September, 1948. It will thus be possible for the Commonwealth Government to give adequate notice to pig raisers of any material alterations in the pigmeat plan, which will continue to operate in its present form until 30th September, 1946.

In respect of dairy products, the arrangement represents a further major advance towards the objective of ensuring for producers a lengthy term of market stability.

In the course of a statement in regard to this arrangement in the House of Representatives recently, the Prime Minister (Right Hon. John Curtin) said: "I am very happy to say that the Government of the United Kingdom has been able not only to understand the problems of this country, but also to have regard for our interests. In a similar way it has treated the Government and people of New Zealand. I have often expressed our admiration of the people of the United Kingdom for their fighting spirit and their valorous resistance to the Nazis, but I also place on record our appreciation of the treatment which they have given to the Dominions, particularly in respect of the prices that they have paid to us for our exports."

Soy Bean.

C. J. McKEON.

ALTHOUGH the soy bean is not a recent introduction to Queensland, it is only within the past few years that it has shown promise of becoming a useful crop in this State. A native of the Orient, it has been an important food crop in Manchukuo, China, and Japan for many centuries, and a large peacetime export trade in soy bean and soy bean products has been developed, particularly from the first-mentioned country. The success achieved with the crop in the United States of America over the past decade has stimulated interest in its possibilities in Queensland. Experience in America and elsewhere indicated, however, that no single variety of soy bean is adapted to a wide range of soil and climatic conditions, and it is accordingly necessary for extensive tests of varieties to be carried out in the major agricultural districts in order to determine the most suitable varieties for each particular area. Variety tests have been made in several districts, but it is likely to be some years yet before definite results are obtained. The prospects of ultimately establishing soy bean production on a stable basis in some districts, however, warrant further trials.

The soy bean has a wide variety of uses, and may be grown for bean production, green manure, grazing, green fodder, hay, and silage. The beans are widely used in the green form for salads and canning, and the dried bean is used as a vegetable and for flour and vegetable milk manufacture. The bean meal is a valuable stock food and fertilizer and has a variety of industrial uses, and the soy bean oil is utilized extensively in many industries, especially the ply wood industry, which is an important one in Queensland. Although soy beans are of value as green manure, grazing, and hay crops they so far do not appear likely to displace cowpea for such purposes, because the latter yields heavily and consistently in most agricultural districts.

The soy bean is an annual, summer-growing plant, reaching a height of 2 to 5 feet. The branched, woody stems carry large leaves and bear the pods, which are from 1 to 2½ inches in length and contain 2 to 4 seeds. It is not so tolerant of acid soil conditions as are the cowpea and the velvet bean, but it is, nevertheless, capable of growing on fairly acid soils and on partly impoverished land. The soy bean will thrive on average quality soils but prefers the deep loams and red volcanic

soils which are favoured for maize. The plants withstand dry weather better than maize once they have become established, but they have not shown the drought resistance of cowpea.

Cultural Requirements.

Land required for soy bean production should receive the same cultural treatment as when being prepared for maize, and it is most essential that the seed be sown in a well-prepared seed-bed.

Sowing can be carried out at any time to suit local conditions after the danger of frost is over, care being taken to arrange sowing so that crops which are to be harvested three to five months later for grain will mature when fine weather might be expected. This is rather important because if the pods develop during prolonged wet periods they will be seriously affected by mould. As a general rule December and January can be regarded as suitable months for sowing. The crop is usually sown in rows 3 feet to 3 feet 6 inches apart according to the variety and the purpose for which the crop is grown. The seed should not be sown too deeply, a depth of 1½ inches to 2 inches being ample. An ordinary maize drill is ideal for sowing. The seed varies greatly in size and consequently the amount of seed required per acre will vary, but for average-sized seed, sown in drills 3 feet 6 inches apart with approximately 6 to 8 inches between the plants, 15 to 16 lb. per acre will be ample. When sown broadcast, at least double that amount will be necessary.

So far it has been the practice in Queensland to sow the crop in drills as just described, but it may be found that a closer spacing between the rows will be necessary if large scale production is warranted; in such an event machine harvesting will be essential to permit of the crop being produced economically.

Varieties Under Test.

The chief named forage-type varieties under test in Queensland are A.K., Black Eyebrow, Ebony, Virginia, Wilson (early-maturing); Laredo, Mammoth Brown, Tarheel Black (medium-late); Biloxi and Otootan (late-maturing); the most promising and also the most consistent variety so far, being Otootan. Grain types include A.K., Dunfield, Illini, Ito San, Kingwa, Manchu, Mandell, Tokyo (early-maturing); Easycook, Haberlandt, Herman, Mammoth Brown and Mammoth Yellow (medium- to late-maturing). Of the grain varieties, A.K., Tokyo, and Easycook have given good yields. Mammoth Brown, Biloxi, and Mammoth Yellow varieties have seeds three or four times as large as those of Laredo, Otootan, and Ebony. The seeds of the remaining varieties are intermediate in size, but all are much smaller than those of Mammoth Brown, Mammoth Yellow, and Biloxi.

The soy bean is a suitable crop for grazing by both cattle and sheep, a late-maturing forage variety, such as Otootan or Biloxi, being chosen. Grazing may be commenced when the soy bean plants are 12 to 18 inches high and before flowering has started. Stock should be put on to a small section of the crop for only a few hours a day over a short period, and the section should then be spelled to allow the soy bean to recover.

Soy bean hay is a highly nutritious fodder and for haymaking purposes a leafy, late-maturing variety, either Otootan or Biloxi, should be used and sown early, in rows spaced about 3 feet 6 inches apart.

The crop should be cut for hay when the pods are formed and the beans half developed. A mower or a reaper may be used to cut the crop which should be built into cocks shortly after cutting in order to prevent excessive drying. If the crop is cut with a reaper and binder the greatest care is necessary to see that the sheaves are not tied too tightly, otherwise moulds are sure to develop. Even when loosely tied it is advisable to examine the sheaves periodically during curing. Like cowpea, the crop requires very careful handling while curing to prevent loss of leaf, and the same treatment as is recommended for cowpea should be carried out in the case of soy bean.

When planted for green-manuring purposes, soy beans should be sown broadcast or in close drills, a late-maturing forage type being selected. The crop should be ploughed under before the pods begin to form.

If grown for grain purposes, the crop should be harvested just before the first pods commence to shatter. At this stage many varieties will have shed most of their leaves, Some varieties shatter very readily and care must be taken to harvest the crop immediately it is ready; otherwise a heavy loss of grain may occur.

So far, in this State, the crop has not been grown on a scale sufficiently extensive to warrant machine harvesting, but trials are under way to determine the practicability of doing so with a header. The methods at present in use are to cut the plants with a mower and cure them in stooks until they are ready to be put through a thresher, or to adopt the method in vogue for harvesting peanuts.

Insect pests and fungous diseases of soy bean pods have been common in experimental plantings in Queensland, and it is probable that commercial crops of beans would suffer similarly to some extent.

Soy bean may be used with either maize or sorghum for silage making, and generally a silage of good quality can be obtained from such a mixture.

Seed Not Yet Available.

It should be distinctly understood that no seed stocks are at present available for distribution to farmers by the Department of Agriculture and Stock, and that the small quantities of several varieties now held are required exclusively for trial purposes. In the event of seed supplies becoming available from abroad farmers will be duly informed through the Press.

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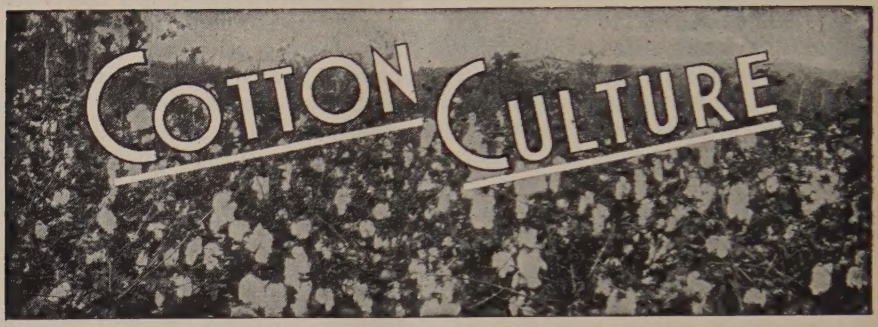


A Review of the 1943-44 Cotton Growing Season.

W. G. WELLS.

Climatic Conditions.

CLIMATIC conditions for the 1943-44 season's cotton crop were reasonably favourable, although better rainfall at mid-January would have substantiallly improved yields in all districts. Excessive rainfall during December in the South Burnett, Moreton, Darling Downs and Maranoa districts—in which approximately 20 per cent. of the acreage was sown—promoted such growth of weeds and grass that with the prevailing labour shortage a considerable acreage of cotton had to be abandoned. In addition, the resultant deeply saturated heavier soils set so hard during the long dry period in January and February that plant growth was affected and much loss of the middle and top crops occurred.

In the remaining districts, weather conditions were, in general, favourable for early planting and thus ensured satisfactory growth of the resultant seedlings. By the end of December most fields were carrying such good crops, that substantial rainfall during January and February was required to mature them. Unfortunately, prolonged hot, dry conditions during January in some of the largest cotton growing districts, particularly in the Callide Valley, reduced yields appreciably, but the average ultimate returns where proper cultural practices had been followed were fairly satisfactory. Where sufficient rainfall occurred in January to promote steady growth until the February rains, very good yields were produced in the well cultivated crops.

District Irrigation Investigations.

The results obtained from the testing of the merits of growing cotton with supplementary irrigation supplied from individually owned plants were not, as a whole, in keeping with the possibilities of growing cotton with such assistance. Generally, co-operators either did not plant because of labour shortage or, for the same reason, were unable to maintain clean cultivation on the fertile alluvial soils under the wet spring and early summer conditions. In some instances where the crops got off to a good start, labour shortage also prevented an irrigation application at mid-season, when it was urgently required to obtain a good yield.

Biloela Research Station Investigations.

The results obtained in a comprehensive programme of experiments conducted at the Biolela Research Station indicated once again the advantages to be gained through planting cotton in the first three seasons following Rhodes grass. Confirmation also was obtained of previous findings of the value, to the following cotton crops, of the subsoil moisture conserved by March ploughing of Rhodes grass. Mid-September plantings on March ploughed grassland yielded 1,131 lb. seed cotton to the acre—a very satisfactory yield considering the period of five weeks of hot dry weather in January and February. Old cultivations once more failed to produce much in excess of 500 lb. seed cotton to the acre. Undoubtedly by ploughing their grassland in the late summer before the grasses have utilised the moisture from the summer rains, farmers can usually conserve a good supply of subsoil moisture which will materially improve the yield of the following cotton crop, particularly in early plantings.

The results of investigations into the merits of supplementary irrigation and the correct application of water, once again indicated that farmers should use this method of growing cotton where irrigation can be applied economically on soil suitable for that crop. On a fertile cultivation in the fourth year after native grassland, cotton planted in the third week of October following a 3-acre-inch spray irrigation, and given two similar applications at mid-season, yielded 1,741 lb. seed cotton to the acre, compared with 653 lb. in rain-grown cotton. In a five variety trial to ascertain the best cotton to grow under irrigation, the lowest yield was 1,822 lb. seed cotton to the acre, and the highest 1,927 lb. Altogether, 8 acres of irrigated cotton covering times of planting and watering, produced an average yield of 1,608 lb. seed cotton per acre.

Cotton Breeding.

The work of developing improved strains of the main commercial cottons was done under seasonal conditions which were conducive to testing the merits of the more advanced strains, and very promising results were obtained in some varieties.

A comprehensive programme of work at centres in the Moreton district and in the Central and Upper Burnett districts was carried out in the Triumph variety, as this appears to be one of the most promising cottons for very fertile soils of the lower slopes and the alluvial flats in these areas. The objectives of this work are to improve the strength and length of the fibres, as well as to increase size of boll without losing the earliness of fruiting and the yielding ability of the variety. Several of the newer evolved strains showed sufficient superiority to the parent stock in these respects to warrant their multiplication for eventually replacing it.

Satisfactory progress also was achieved in improving the Lone Star variety. This is a big boll type which has for years given the best results on the harder, less forcing soils in the drier cotton growing districts of the State. A good multiplication was obtained of the seed stocks of the most advanced strain of this variety, which produces more uniform fibre, has a slightly higher lint percentage and yields as well as the commercial stocks of the variety. The seed obtained will be further multiplied during the coming season to replace eventually the

older strains of Lone Star. In the breeding centre at Mundubbera, in the Central Burnett, several of the more advanced, newly evolved strains of this variety produced very satisfactory crops of large, well-opened bolls containing cotton of very good quality. In addition, these newer strains have substantially higher lint percentages than the commercial stocks of this variety. Providing further satisfactory results are obtained in subsequent trials of these newer strains, it would appear that the standard of performance achieved in them will place the Lone Star variety in a very satisfactory position.

The work of improving Miller, the most extensively grown variety in this State, was concentrated in the Callide Valley, where the most crops of this variety are planted. Sufficient seed was produced of the two more advanced improved strains to ensure of the complete replacement of the commercial stock of this variety, which has been grown for some years. Tests of progenies and multiplication stocks evolved out of these strains indicated that, in turn, superior strains will be available to replace them, not only because of greater uniformity of fibre, but also because of higher lint percentages.

The work of developing jassid-resistant types through either selection of superior jassid-resistant plants out of commercial stocks of Miller, or by hybridizing jassid-resistant varieties with otherwise superior Miller strains, progressed very satisfactorily at the Biloela Research Station and with grower co-operators in the adjoining districts. Tests of the Miller selection, III-26-0, indicated once more its very high degree of resistance to jassid attacks. Accordingly, the seed stocks of this strain will be multiplied sufficiently to supply the areas where a jassid-resistant Miller cotton is required. Several newer selected Miller strains with larger bolls and longer fibre than III-26-0 also gave evidence of high jassid resistance and will be further tested for their suitability to replace III-26-0. Very promising results also were obtained in both the multiplication plots of several of the most advanced hybrids evolved for jassid resistance, and in the breeding block of the newer hybrids.

Breeding operations in the New Mexico Acala variety consisted of a continuation of the work of developing a superior long staple strain for growing with supplementary irrigation in the Central district, and in the drier sections of the Upper Burnett, where this variety appears to be suitable for this method of growing cotton. In addition, in the South Burnett district, where this variety yields heavily under rain-grown conditions on the less fertile forest slopes, work was continued in the evolving of a strain producing stronger cotton than the present commercial stock. A mass-selected stock obtained in the previous season at the Callide Valley centre, showed superiority over the parent, and will, therefore, be further multiplied and reselected for eventual distribution to irrigationists requiring this variety. Several promising progenies were retained at the other centres for further testing. A large number of new selections also was obtained for examination in the progeny blocks of the coming season.

The ability of the Qualla variety to withstand very dry conditions when grown on infertile soil was again amply demonstrated this season in the breeding plots of this variety in the Moreton district. Very satisfactory yields of good quality one-inch cotton were obtained in several progeny increases and new progenies which also retained the attractive size of boll of this variety. Sufficient multiplication of seed

of the most advanced progeny increase was obtained to allow of district trials being carried out in the coming season to ascertain the probable scope of usefulness of Qualla on the less fertile soils of the Moreton, Darling Downs and Maranoa districts, where a variety highly resistant to stress conditions is required. A large number of very promising new selections and twelve progeny increases were retained for further testing.

Harvesting.

Because of the increased demand for the Women's Land Army to harvest vegetable and fruit crops, approximately only 200 members could be made available for the cotton harvest. They were housed mostly in camps centrally located in areas in which there were sufficient acreages of cotton to provide full employment until the end of July, when the Army was required in other agricultural industries. A general scarcity of labour prevailed in all districts, and this shortage resulted in such a slow picking of the crop that a considerable proportion of it was harvested by snapping.

Grades.

The slow harvesting of the crop resulted in a lowering of grades of much of the cotton through long exposure to the weather. Moreover, the snapping of much good sound cotton lowered the grades of such cotton, as compared with those that would have been obtained by hand picking. The grades of the snapped cotton were better than usual, however, through the inclusion of so much well matured cotton that normally would have been hand-picked had ample labour been available.

Acreage and Yields.

The season's results, as a whole, confirm the findings of previous years that early planting on well prepared seed beds containing a good reserve of subsoil moisture in cultivations in the first three seasons after grassland, undoubtedly improves the prospects of obtaining highly satisfactory yields of rain-grown cotton. Many farmers averaged yields of 700 lb. seed cotton to the acre or better, and, in some instances, 1,200 to 1,500 lb. to the acre on sizeable areas. The total yield from the 16,000 acres reported as producing cotton will approximate 6,000 bales of raw cotton, which will be the highest average return obtained for 24 years.

CHANGE OF ADDRESS.

Changes of address should be notified at least fourteen days before the date of issue with which the change is to take effect. The former address should be given as well as the full Christian names and surname of the subscriber.

Address all communications to the Under Secretary, Department of Agriculture and Stock, Brisbane.

Some Tropical Fruits and Strawberries—Harvesting, Packing, and Marketing.

GENERAL HARVESTING CONDITIONS.

AS in the case of other fruits, care is essential for the successful handling of tropical fruit. Climate and temperature when harvesting is in progress are big factors in the successful carriage of tropical fruits to local and distant markets. These fruits are of such a delicate nature that every care must be taken to avoid carelessness and rough handling. Care should be taken by growers to see that fruit after harvesting is allowed to cool before being packed. Close attention to this point is necessary if fruit is to be carried over long distances and is expected to be in a satisfactory condition when it arrives on the market. Fruit packed while in a heated condition holds the heat for a long period during transit, thus causing premature ripening or sweating, with the certainty of the consignment opening up in an over-ripe or wet and musty state, which is just the condition suitable for the development of moulds and transit rots. Fruit in this plight has only a short commercial life, and has to be sacrificed by the agent to distributing retailers for rapid disposal, usually necessitating a substantial reduction in price to ensure a quick sale. Such sales often have a detrimental effect on the price or the demand for sound consignments. By taking advantage of the time of the day, and picking the fruit while its condition is unheated, precooling is made considerably easier. If necessary, after picking, spread the fruit out in a cool place to reduce its temperature before packing. A flat-topped table with the surface covered with bags or other soft material is just the thing required for cooling, and is also a good sizing and packing bench.

PACKING THE PRODUCT.

Care in Making Cases.

Growers, after taking every care in handling their fruit while harvesting and packing, often, through carelessness in making and nailing down cases, offset an advantage already gained by careful handling. Careless nail-driving, causing nails to protrude inside the box from the timber of the case, often results in damaged fruit with consequent waste. Nail-marked fruit decays, breaks down, and affects adversely the sound fruit in the box. Nails protruding through the outside of a case are a danger to all handling it in transit, often causing bad cuts or loss of temper, and rough handling in consequence. Extra care in such matters is well worth while, and saves trouble.

The "Get Up" of the Package.

Attractiveness is the main feature to be studied, anything added or done to make the product worth more to the buyer being a big factor in quick sales and higher prices. The following points are well worthy of consideration:—

Use only clean, well-made cases. Second-hand cases should be thoroughly cleansed before using again.

Plain white or coloured paper is much more attractive and cleaner than newsprint, while the extra cost is only a fraction of a penny.

Where it is necessary to use packing, clean woodwool is preferable to most types of grass and other packing.

Fancy labels are an improvement, but if using stencils or rubber-stamps care should be taken to apply them neatly and so avoid smudging and spoiling the appearance of the finished package. The packer's full name and address, with variety and contents of the case, as required by the Fruit and Vegetables Acts, should be embodied in labels or stencils.

Wiring the case is an improvement. Often the wiring together of two small cases to make one package is an economy and an insurance against the rough handling of smaller packages. Wiring is also an attraction to the buyer who desires to despatch fruit to distant places.

CUSTARD APPLES.

Harvesting.

Picking custard apples at the right time is also essential in keeping buyers and consumers satisfied, besides helping in keeping up the demand. Custard apples picked too soon inevitably go black and become unsaleable and unattractive. The fruit should be picked when it is in a firm mature condition to ensure good carrying and ripening qualities. A good indication of the correct time to harvest custard apples is when the interstices between the corrugations of the fruit have turned to a rich creamy colour. Fruit picked at this stage, if firm, will carry well and ripen excellently. Packing will present no difficulties if the operation of sizing and that of packing are carried out separately.

Sizing.

To obtain the best results when marketing custard apples, care should be taken to pack the fruit in the best possible manner for marketing. Clean cases, nicely stencilled with the packer's name and address and the number of fruit in the case, add to the market value of the product. Most custard apple growers consider it unnecessary to size and pack their fruit. Like all other fruits, when this is done the value is considerably raised, both from the seller's and buyer's point of view. Buyers do not like to purchase fruit of mixed sizes, as they have no means of arriving at what a case containing varying sizes is going to realise when sold at so much per individual fruit at prices varying according to the size. When a case is sized this return can easily be calculated, and a price paid accordingly. When a buyer cannot calculate the actual return he is likely to receive for a case of fruit, it is only to be expected that he will be careful to safeguard himself and pay a lower price than the fruit is actually worth.

Sizing is an operation that should be carried out in the shed before packing. An excellent sizing table is one with a flat top, covered with clean sacks, with a 3-inch high beading around the edge to stop the fruit from rolling off. For best results the operator should size by hand into at least four different heaps of fruit of approximately even dimensions. It is also advisable to clean the fruit by carefully brushing if its appearance is affected by Mealy Bug or other pests.

Packing.

By packing two different counts from each heap packers will size the fruit automatically into six or seven sizes. The best container is the dump half-bushel case, 18 inches by 7⅛ inches by 8⅔ inches. For the larger sized fruit, with the counts 8, 10, 12, and 14, the case is best made up in the narrow way—viz., 18 inches long by 7⅛ inches wide by 8⅔ inches deep (see Plate 80); but for the smaller sized fruit, with the counts 15, 18, and 21, the wide way, 18 inches long by 8⅔ inches wide by 7⅛ inches deep, will be found most satisfactory. (See Plate 81.)

Following are the packs and counts:—

NARROW CASE PACKS.

18 inches long by 7⅛ inches wide by 8⅔ inches deep.

Pack.	No. in First Layer.	No. of Layers.	Total.
1 x 1	4	2	8
1 x 1	5	2	10
1 x 1	6	2	12
1 x 1	7	2	14

WIDE CASE PACKS.

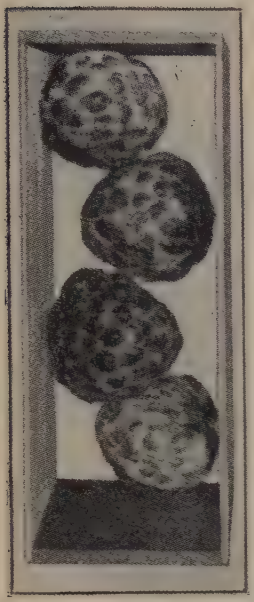
18 inches long by 8⅔ inches wide by 7⅛ inches deep.

Pack.	No. in First Layer.	No. of Layers.	Total.
2 x 1	8	2	15
2 x 1	9	2	18
2 x 1	11	2	21

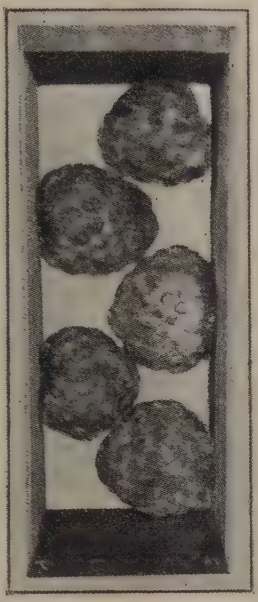
These packs and counts should pack any average sized line of custards, but growers with only a small quantity would possibly not need to do all of these counts.

With very large fruit it is better to adopt a single layer tray of a suitable depth. For distant markets the single layer tray is the best container. Owing to the irregular shape of the fruit commonsense has to be used in getting the fruit to fit in snugly, careful selection of irregular-shaped fruit to match each other being a great help in obtaining a good pack. Force should not be used under any circumstances. A bigger latitude in sizing is necessary in handling custard apples than in handling fruit such as citrus or tomatoes. Only a quarter of an inch variation is allowed in citrus and kindred fruits, but the variation in the sizes of custard apples will greatly exceed this according to the shape of the fruit. One of the main objects of packing is the protection that it gives the fruit, and growers when packing want to keep this

First Layer 1 x 1 Custard Apple Packs.



8 Count—1st Layer.



10 Count—1st Layer.

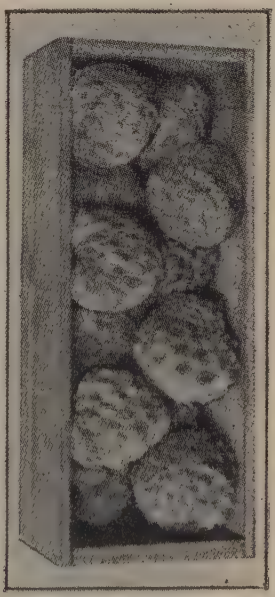
12 Count—1st Layer.

Note the protection given to the soft points of the fruit.

Finished Cases.

8 Count—Finished Case.

10 Count—Finished Case.



12 Count—Finished Case.

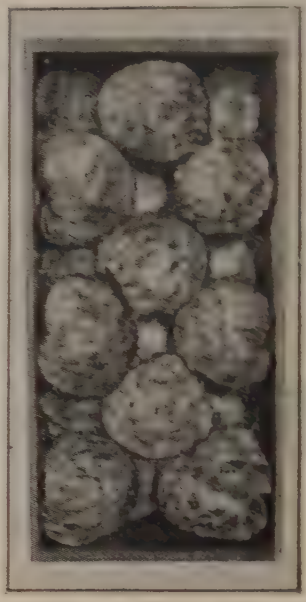
Plate 80.

CUSTARD APPLE PACKING FOR THE LOCAL MARKET.—Large sizes. Australian Half Dump Case. Case made on narrow system 18" long x $7\frac{1}{8}$" wide x $8\frac{3}{4}$" deep.

object in view. As custard apples soften first at the point or opposite end to the stalk, the packer wants to keep foremost in his mind the placing of fruit to the best advantage to protect the parts which might soften first while in transit. By keeping the point of the fruit turned

2 x 1 Custard Apple Packs.

18 Count—1st Layer.

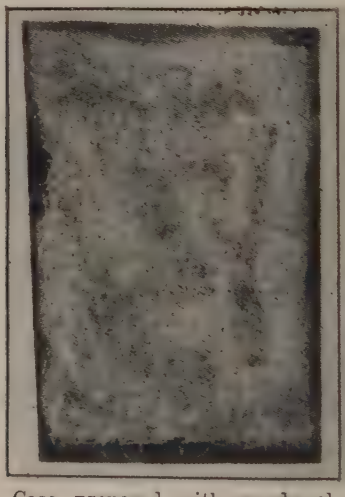


18 Count—Finished Case.

Note the protection given to the soft points of the fruit.

Plate 81.

CUSTARD APPLE PACKING FOR THE LOCAL MARKET.—Small sized fruit. Case made on the wide system 18" long x 8⅝" wide x 7⅛" deep.



Case prepared with woodwool for placing the Custard Apples on.

Finished Case with the top layer of woodwool removed. Note the padding between each fruit.

Plate 82.

CUSTARD APPLE PACKING FOR EXPORT.

inwards from the wood of the box the maximum amount of protection is obtained from bumps and vibration during handling and in transit. A study of the illustrations will help to explain this.

If a packer happens to use other counts and packs than those given here, close attention to the protection of the fruit will be of assistance in good transit and satisfactory condition on arrival at the markets. Cases should be packed high enough above the top of the box to allow a slight pressure to be placed upon the fruit by the lid when nailed down. Care should be taken that there is no loose fruit in the case as the constant rattling and vibration in transit will soon render the fruit unfit for sale. It is well to remember that one broken custard apple will often make a mess of the whole consignment.

Packing for Export.

For long distance transport the best container is the single layer—half-bushel standard, 18 inches long by 11½ inches wide, by 5¼ inches deep—tray with the fruit nested or padded in woodwool. (See Plate 82.) The tray is first prepared by placing a layer of woodwool on the bottom and around the ends and sides. The fruit is then placed in position in a single layer with a small space between each fruit. It is advisable not to wrap custards when sending long distances, as it hastens the process or ripening. Woodwool is then placed in the spaces between the fruit to form a small pad for each fruit, and a layer is spread on the top of the pack and the case nailed down. The whole case should be packed so that it will not rattle when shaken gently. Fruit packed in this manner carried to Tasmania for show purposes, and although soft on arrival was exhibited for three days, and was then in still good eating condition. Fruit packed without woodwool in the same type of container was unfit for consumption on arrival at the show. Care should be taken that no fruit projects above the top of the tray before nailing down. Two trays wired together make a handy package for transport over long distances. No difficulties in marketing should be experienced by growers if judgment and commonsense are used in handling these fruits.

PAPAW PACKING FOR DISTANT MARKETS.

Sizing.

In packing papaws the foremost idea in the mind should be the best method of giving the maximum protection to the fruit in transit, and the packing of the fruit so that it will display to the best advantage when exposed for sale. Before being packed the fruit should be cooled and sized. To assist in making the operation of packing easier, it is a great help to endeavour to match the various-shaped papaws whilst sizing them into heaps. Four sizes should be sufficient to cover the packing of papaws for export. As with custard apples, sizing is easily done on a flat-topped table covered with soft bags or other suitable material. Many growers do not think it necessary to go to this trouble, failing to appreciate that the skin of the papaw is exceptionally tender, and that the slightest scratch will cause the fruit to bleed, thus damaging the appearance of the fruit.

Packing.

The best container for long-distance carriage of papaws is the tropical fruit case, 24¾ inches long by 12 inches wide by 12 inches deep. (See Plate 83.) Woodwool is the most satisfactory packing. The box is prepared by placing a layer of woodwool on the bottom of the case and around the ends and the sides. Each papaw is then wrapped in soft paper and placed in a single layer in the prepared box, using small pads

of woodwool to make individual fruit firm and snug. A thin layer of woodwool is then placed over the top of the fruit, and the process is repeated until the case is full, finishing off with a layer of woodwool packing on the top. It is unwise to have the fruit projecting too far above the top of the box, but the lid of the case should press just firmly enough to keep the fruit snug and firm. Packers should avoid placing too much padding in the case. Care in matching the various-shaped fruit will greatly assist in this. By using a coloured wrapper in conjunction with the woodwool a very attractive package can be placed on the market. Care in eliminating all green, over-ripe, or diseased fruit when packing is absolutely necessary to ensure safe transit and satisfaction to buyers.

Packed in Tropical Fruit Case 24¾" x 12" x 12". Fruit wrapped in soft paper and nested in woodwool.

Plate 83.

PAPAWS PACKED FOR EXPORT.

Packed in the Dump Case used as a tray by removing the side; 18" long x 14¼" wide x 8⅜" deep. Note the woodwool padding between the fruit.

Plate 84.

PAPAWS PACKED FOR LOCAL MARKET.

Packing for Local Markets.

Growers who are near enough to their markets to be able to use motor transport have a decided advantage over those who have to send over long distances. The fruit can be left on the tree to become almost fully ripe before sending to market, and it is not necessary to pack in the same manner as when sending farther afield. Close attention should be paid to the elimination of all disease-infected or marked fruit, and sizing should also be rigidly adhered to. The Australian dump case, made in the form of a tray 18 inches long by 14¼ inches wide by 8⅜ inches deep, is a good container for the local market (Plate 84). The fruit is packed on end in a single layer resting on a layer of woodwool or similar packing. As a protection against rubbing the bottom end of each fruit, it should be wrapped for about two-thirds of the way up in clean white

or coloured paper, while each fruit is made snug and tight by pushing pads of woodwool in between each fruit. Papaws packed in this way have a very attractive display value, and sell much more readily than those carelessly placed in cases without packing, the buyer being able to appreciate the quantity and quality at a glance.

MONSTERA DELICIOSA.

Packing for Distant Markets.

This is a fruit that is not well known out of Queensland. Many people tasting the monstera for the first time are favourably impressed, and are keen to know where supplies can be secured. Many specimens of this fruit bought by people, however, do not come up to expectations because growers are afraid to allow the fruit to stay long enough on the plant on account of its tendency to fall to pieces when ripening. The latter tendency can be overcome by winding a strip of paper around the fruit when packing, to prevent the outside shell from falling as the fruit ripens. Fruit packed like this will ripen over its entire length, and still retain its full flavour when consumed three weeks after being harvested. The standard half-bushel case, 18 inches long by 11½ inches wide by 5¼ inches deep, is an ideal case for the monstera. The fruit is packed in layers and made snug by placing a thin layer of woodwool on the top and bottom and between the layers. Lining the case with clean white or coloured paper is an added improvement to the appearance of the case.

PACKING STRAWBERRIES.

Containers.

Many containers are used for marketing strawberries. In some of the Southern States a punnet is in general use, but as this container has the disadvantage of containing more than one layer of berries with each layer resting upon the other, it is not as good a container as the single layer packed boxes in general use in Queensland. There are two types of boxes in use—one which measures 8 inches long by 4 inches wide by 1¼ inch deep, and the other 24 inches long by 8 inches wide by 1½ inch deep, measured clear of a central partition which it has. The smaller of the two containers is preferable, because it gives less latitude for mistakes and spoiling the appearance and alignment of the fruit when packing. Being smaller, it will not give the fruit as much play to became loose in the box through careless handling, so causing damage through rubbing and otherwise. It is also a better container for retailing, the larger box or tray, which contains the equivalent of six smaller boxes, holding too much fruit for the average buyer, necessitating repacking into smaller boxes. As the strawberry is such a soft fruit, it is necessary to handle it as little as possible. The smaller container also has the advantage of allowing better sizing and packing when the supply of fruit on the farm is short for marketing. Twenty of the boxes 8 inches by 4 inches by 1¼ inch will just fit comfortably into a half-dump case.

Handling.

Unlike other fruits, the strawberry does not necessitate a large, complicated, costly equipment in the packing-house to size and grade. This is done by hand, and much labour can be saved by grading while picking. Sizing is best done in the packing-house.

A good picking container is a tray with a handle. (See Plate 85.) When picking, the first-class berries fit for marketing can be placed at

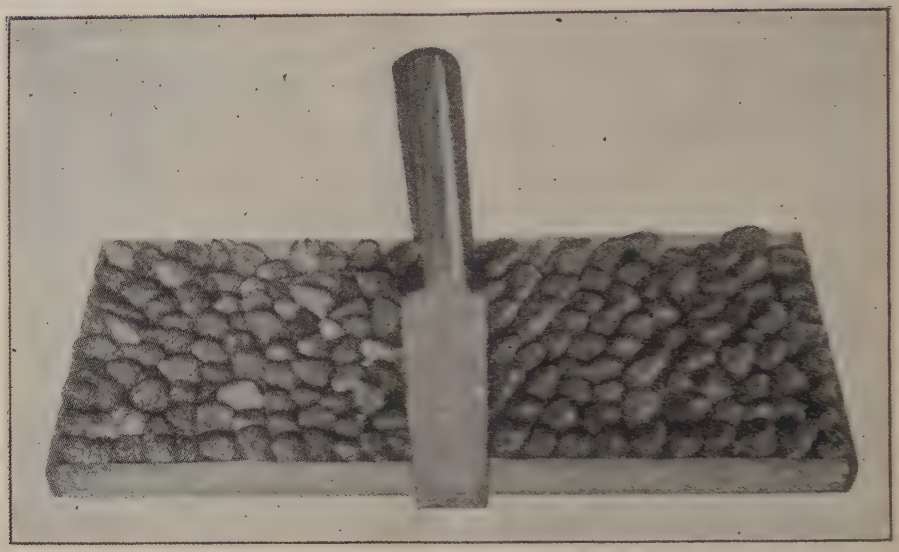


Plate 85.

PICKING TRAY FILLED WITH FRUIT.—Note the different grades and colour of fruit that are placed at either end of the tray when picking.

one end of the tray, and second-class or factory berries placed at the other. By doing this the berries are automatically graded. Berries are packed for market in three sizes—threes, fours, and fives. Sizing is done while packing, the packer having a box for each size. Women and girls usually make the best berry packers, having as a general rule a lightness of touch which is often lacking in the case of men operatives. Berries with grains of earth adhering to them, as is often the case after rain, should be gently brushed. This can be done by placing a soft lacquer brush as a fixture, standing upright in the bench, and by taking the berry by the stalk and gently running it through the bristles of the brush.

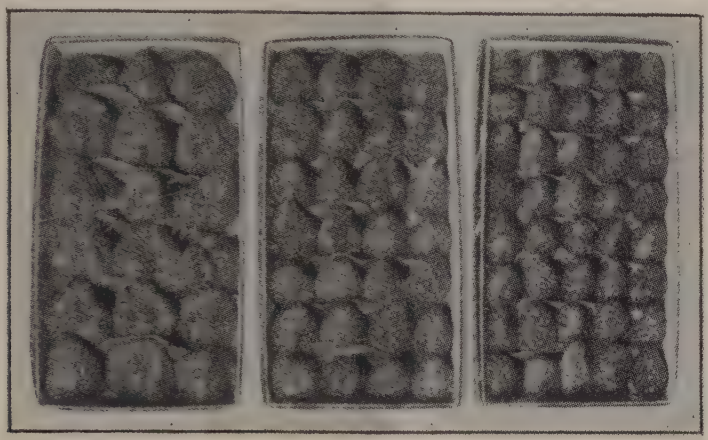
Plate 86.

METHOD OF STARTING TO PACK.—Note the placing of the leaves to separate the fruit.

Packing.

The method of packing is simple enough. The box is first prepared by placing a prepared leaf across the end of the box—passion fruit leaves are very suitable, while fern leaves are sometimes used where passion fruit leaves are not available—with the leaf projecting high enough to reach to the top of the box, and at the same time being bent enough to place thereon the first line of berries—threes, fours, or fives, according to size. The berries should be placed on their stalk ends with the points up, allowing the point of the

fruit to reach to the level of the top of the box. (See Plate 86.) Another prepared leaf is then placed in the box, bent so as to rest on the bottom of the box to have the next line of berries placed thereon, while the remainder of the leaf rests against the first line of berries and acts as a separator of the lines of fruit. This process is repeated until the box is filled. (See Plate 87.) For travelling a layer of leaves placed on top of the finished pack is an assistance.



Threes. Fours. Fives.

Plate 87.

FINISHED BOXES.—Note the alignment of the fruit in each box. Also the placing of the leaves between each row of fruit.

Points to be watched are—

See that the fruit is placed so that it will come as near as possible to the top of the box, and it will then keep snug when the lid is placed in position.

Avoid packing too high.

Keep the alignment of the fruit straight both across the box and from one end to the other. (See illustrations of packed boxes).

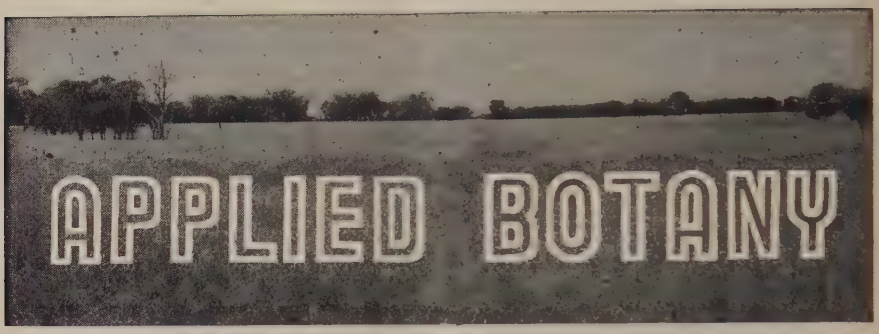
Avoid placing too large pieces of packing leaves between the berries.

See that the berries do not rattle in the box after the lid is placed in position.

Keep all badly-coloured berries out of the box, as they spoil the commercial appearance of the package when displayed for sale.

On no account pack damaged berries, no matter how slight—they spoil the keeping qualities of the box. One bad berry soon makes a whole boxful practically unsaleable.

It is recommended that growers should stamp the pack of the fruit on the lid of each box, so that when being sold the seller can see at a glance whether they are threes, fours, or fives without having to remove the lids. This would be in addition to the name and address of packer required by law in letters $\frac{3}{16}$ inch at least in height to be stamped on the top of the lid and the end of the box. Use rubber stamps, as they are quick in application and make a finished job. When sending away packed in cases, see that stencilling is done neatly and free from edge of the stencil plate smudges.



New Guinea Timbers.

C. T. WHITE.

The following notes on some of the trees of New Guinea were made by Mr. White, Government Botanist, in the course of a tour, under Army auspices, during July and August of this year through parts of the territory freed from Japanese invasion.

FOR the main part, New Guinea is covered with a dense, heavy rain forest or jungle, known in Queensland as scrub, and in New South Wales as brush. Along the south coast of the country, however, there is much open forest very similar to the forested grasslands of North Queensland and the Northern Territory. There is an undergrowth of grasses and herbs with a covering of Eucalypts, mainly of the bloodwood group. In the more swampy areas, different kinds of tea tree and swamp mahogany take the place of the Eucalypts. Extensive areas are also covered with large sac sac or sago swamps.

A feature which distinguishes New Guinea very sharply from Australia is the height of the mountains which reach their greatest altitudes in Dutch New Guinea with Mount Carstenz 16,400 feet, Mount Wilhelmina 15,416 feet, and Mount Juliana 14,760 feet. The interior of the whole country is extremely mountainous and the ranges running the length of the interior sharply cut off the Australian element in the flora from the northern side.

Although the Australian element in the southern half of the island is mainly developed in the open forests, it enters also into the rain forests in the form of Silky Oaks and Flindersias, the latter group including the North Queensland Maple, Silk Wood, Cairns Hickory, and other valuable Australian timber trees. In the northern half, the Australian element is almost entirely missing. A few of the trees are common to North Queensland and New Guinea, but most are confined, it is thought, to the latter country or are of Asiatic origin. In addition to the rain forests, there are some big areas of grassland with very few trees, but Eucalypts or gums are absent, their place being taken by a small leguminous tree, *Albizzia procera*, abundant in North Queensland especially from Townsville to Mackay, where it is commonly known as "acacia."

The commonest tree in the northern rain forests is probably Tauan (*Pometia pinnata*), being cut extensively for use at the present time. It is a large tree 100 feet or more high, with a good bole buttressed at

the base and with a heavy crown of foliage. It is a very good useful interior wood of a reddish colour. One advantage is that it bends well and C. E. Lane Poole, in his valuable report on the timbers of New Guinea, states that it has been used for boat planking with some success. Botanically, the Tauan is very closely related to the lee chee, the well known Chinese fruit often seen in the dried state in Australian shops, but much superior when fresh. As in the lee chee, a whitish, creamy, somewhat translucent pulp surrounds the seed, and this is a favourite delicacy with natives and whites alike.

New Guinea Walnut (*Dracontomelum mangiferum*) is commonly associated with Tauan. It is a large tree buttressed at the base with rather a light-brown scaly bark; the scales shed in patches, leaving a smooth trunk. The heartwood is hard and dark, with a walnut grain and is a very pleasing furniture wood. Botanically, it is more nearly allied to the Burdekin Plum than to the North Queensland Walnut. The Burdekin Plum (*Pleiogynium Solandri*) is also found in some parts, particularly in the south-east, and is cut to a limited extent. It is an excellent wood for turnery and makes up into handsome furniture.

Plate 88.

A Large Erima Towering Above the Rain-forest.

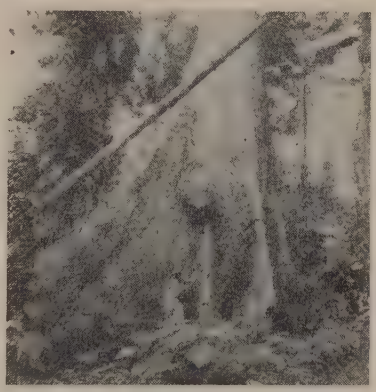


Plate 89.

Base of Large Erima Shown in Plate 88.

New Guinea Rosewood (*Pterocarpus indicus*), an excellent cabinet timber of a deep reddish colour, is one of the most beautiful of New Guinea woods. Unfortunately, the trees are mostly of somewhat irregular growth and have a habit of sending out branches from the side of the trunk. The tree can be easily identified in the field by the red blood-like sap which runs freely from it when cut.

New Guinea Teak (*Vitex cofassus*) is another beautiful timber, but like Rosewood the trees are often gnarled and have many side branches. It is closely allied and similar in appearance to the Lignum Vitae of Eastern Australia (*Vitex lignum-vitae*). The dark heartwood is a good general purpose timber. It is much favoured by the natives for making canoe paddles.

Busu Plum (*Parinarium corymbosum*) is a wood which was determined specifically on a recent visit to New Guinea. It is a rather dark, handsome timber which should be suitable for high-grade cabinet work.

Pacific Maple is a general name for several timbers of a pale reddish colour which I have been unable to determine specifically. They are cabinet woods of a similar type to Queensland Red Bean or Miva Cedar.

Erima (*Octomeles sumatrana*) is worthy of mention as being one of the largest of New Guinea trees. Good specimens are nearly 200 feet high, heavily buttressed to a height of 12-15 feet or more, and with a girth of 15 feet above the buttresses. They provide a clear bole of approximately 100 feet. It is a very light timber, but is suitable for all classes of indoor work. On the Papuan side it is mostly known as Ilimo, but the New Guinea name Erima has been adopted for it by the trade.

Trees also worthy of mention are the Dipterocarps, a group not found in Australia, although furnishing the main building timbers of Malaya and the Netherlands East Indies. They are found in patches in New Guinea, attaining their greatest development in the north-west portion and around Milne Bay. Some of them yield valuable resin (Malay dammar). The resin of at least one of them in New Guinea (*Vatica papuana*) has been collected at Sudest and exported to Sydney where it has been used in the manufacture of varnishes. It is a beautiful clear gum somewhat resembling in outward appearance the Kauri Gum of New Zealand.

Plate 90.

A Fine Calophyllum Tree on the Sea-beach.

Plate 91.

Silk-cotton Tree (*Bombax*).—A large soft-wooded tree with red flowers.

Coniferous trees are well developed in the mountains, and there are some excellent stands of Hoop Pine (*Araucaria Cunninghamii*) and Klinki Pine (*Araucaria Klinkii*). The latter more resembles in growth the Bunya Pine of Queensland (*Araucaria Bidwillii*), but the cones, seeds, and seedlings are more those of the Hoop Pine. As in Australia, these Araucaria trees stand out on the skyline along the tops of the mountain ridges. The Chief Forester for the Territory of New Guinea, Major J. B. McAdam, has experimented with the propagation and growth of the Klinki Pine and has obtained some remarkable results. It is on the whole a bigger tree than the Hoop Pine, 150 feet being an average height and trees well over 200 feet have been found.

Kauri Pine (*Agathis loranthifolia*) so far as I know does not occur either in Papua or the Mandated Territory, being confined to the mountains of Netherlands New Guinea. The She Pines or Brown Pines (*Podocarpus*) are well represented and produce high-quality, sound, firm timbers. The Celery Top Pine (*Phyllocladus hypophyllus*), very similar to the Tasmanian Celery Top, is abundant at altitudes of 7,000-9,000 feet.

Associated with the Conifers are the true Oaks, genus *Quercus* in a broad sense, a group not found in Australia. The New Guinea Oaks are naturally more closely allied to those of the Himalayan region and mountains of south-east Asia than to those of the Northern Hemisphere, but all possess good, hard, durable timbers. It is strange they do not occur in Queensland as they are found on both sides of the main central divide of New Guinea and although essentially mountain trees, they descend to altitudes of 1,000 feet and odd trees have even been seen at 800 feet above sea level.

So far, with the exception of the Oaks, all timbers mentioned are of the softwood class which predominates in New Guinea. Of hardwoods one of the most important is the Kassi Kassi (*Xanthostemon sp.*) of the Milne Bay region. It is a timber closely allied to and of the same type as Queensland Penda.

Kwila (*Afzelia bijuga*) is a tree about 80 feet high, with rather a sparse crown and thin light-brown bark. It is much sought after for posts and piles, being more durable in the ground than other New Guinea timbers. It is similar to West African Mahogany, but is rather too heavy for general cabinet work. On the Papuan side it is mostly known as Melila.

Kamarere (*Eucalyptus Naudiniana*) is a large tree over 200 feet high, which forms large stands in New Britain. It is a Eucalypt and the only one found on the northern side of the Territory of New Guinea. It is quite distinct in appearance from most Australian trees of that family. As a timber, it may probably be best compared with the Blue Gum of New South Wales or Flooded Gum of Queensland and more distantly with the Karri of Western Australia.

Plate 92.

New Guinea Cabbage (*Gnetum*).—The leaves of this tree are cooked as greens. It is characterised by scars around the trunk like those of a palm.

No account of the timber trees of New Guinea would be complete without some reference to the mangroves, large forests of which are found in all estuarian waters along the coast. They are being extensively used at the present time for wharf piles. Unfortunately, their life is limited because of the devastating attacks of marine borers. The most abundant is the Red Mangrove (*Rhizophora mucronata*) and it comprises the bulk of the piles cut. It it also common along the whole of the Queensland coast, but in New Guinea the trees are taller and of greater girth. By means of its prop roots it can extend further out into the water than the other mangroves.

Another fairly common species is the Black Mangrove (*Bruguiera Rheedii*). This has rather rough blackish bark, hence the local name. Its roots run along the surface of the mud and turn upwards here and there forming large knob-like processes, which act as breathing organs for the underground root system of the tree.

A common constituent of the mangrove forests is the Cannon Ball or Puzzle Nut Mangrove (*Xylocarpus granatum*), a tree with a very smooth mottled bark and hard wood. The fruits, about the size of an infant's head, are full of large, light corky triangular seeds. Mangroves are important trees in the East and the management of mangrove forests is recognised as one of the regular duties of foresters. It is possible they may yet become of importance in the forestry policy of New Guinea.

In this brief sketch, only the main trees and mostly those known to me personally are described. The forests of New Guinea are of a very diversified nature and the list of trees attaining a height of over 60 feet and stem diameter of a foot or more would run into several hundreds.

ANSWERS.

(Selections from the outward mail of the Government Botanist.)

Shade Trees in the Southport District.

W.P. (Worongary)—

The most suitable trees for river flats and swampy areas around Southport are the Cotton Tree (*Hibiscus tiliaceus*) and the Cupania Tree (*Cupania anacardioides*), both native trees. The Cotton Tree is fairly conspicuous on the southern side of Burleigh Headland facing Tallebudgera Creek. It is a spreading tree with broad leaves and large yellow flowers. These trees also may be used for windbreaks, for which purpose they could be planted more closely together than when used for shade trees.

For a hedge plant, try the common Duranta (*Duranta Plumieri*). There is another shrub or small tree which could be used as a hedge. It is generally called Vitex; its botanical name is *Vitex trifolia*. There are many shrubs of this plant on the southern end of the Marine Parade at Coolangatta. It apparently has not been planted there, as it is commonly found in such seaside localities. There is no certainty as to how much flood water these two hedge plants will stand. If the trees and shrubs are not obtainable from nurserymen such as Mr. Chas. Petersen, Kuraby, and Mr. Thos. Perrott, of 38 Bowen Bridge road, Valley, Brisbane, you may be able to obtain them through the Town Clerk, Brisbane City Council.

Grass Specimens Named.

W.B.H. (Gympie)—

The grass specimens are as under—

1. Barbed Wire Grass (*Cymbopogon refractus*), a common grass of inferior natural pastures in Eastern Queensland. It has relatively little value as a fodder grass.

2. A species of *Digitaria*. All seed has fallen so that it is not possible to say precisely to which species it belongs. Most of the species, however, are fair fodder grasses.

3. Kangaroo Grass (*Themeda australis*), a common species of natural pastures, particularly on hillsides. It is a fair second-rate grass for grazing, but its carrying capacity is rather low for satisfactory dairying practice.

PLANT PROTECTION

Animal Pests of Field Crops.

J. HAROLD SMITH, Senior Research Officer.

SEVERAL small animal pests are well known in farming and grazing areas by the damage they cause to cultivated crops in the field and to orchard, ornamental, and shade trees. Both rodents and marsupials are implicated.

Of the several species of rats in Queensland, some tend to concentrate in towns and cities, others remain exclusively in the field, and a few are found both in the field and in adjacent farm buildings where grain and grain products are stored. In sugar-cane areas, field rats attract a great deal of attention because the injury to the growing crop is often followed by a certain amount of lodging which creates harvesting difficulties in some seasons. In fruit-growing areas, pine-apples are frequently attacked, large cavities being gnawed into the fruit before it is mature. When numerous, rats may feed on the bark of fruit, ornamental and shade trees, particularly in sub-coastal and inland areas. The injury is restricted to the lower part of the trunk, but if it is extensive, growth may be severely checked or the trees may even be killed outright. Quite apart from their importance as pests of growing plants and stored produce, rats are vectors of Weil's disease, an occupational trouble recorded in field workers among rat-infested crops.

Field mice are also pests of field crops though they are better known by the damage caused to stored grain in farm buildings and to cereal hay stacked on the farm. In field crops, they tend to be most troublesome during late winter and spring when the weather is dry and feed is relatively scarce in the paddocks. Carryover crops such as late maize and sweet potatoes, and spring planted crops, such as pumpkins and cucumbers, suffer to some extent almost every year. In the latter case one or more holes alongside the seed-hills indicate the burrowing activities of the pest as it seeks the seed. Discarded husks usually lie in and around the holes. If the failure of the first planting is due to mice, subsequent sowings usually suffer more severely than the first, possibly because the pest continues to exploit a food supply which it particularly likes. Mice nests, constructed from dead grass and similar debris, are sometimes a nuisance when surplus grass on permanent pastures is cut for hay for the nests foul the cutter bar of the mower and stop the machine. Troubles of this kind are less common in cereal, lucerne, or Rhodes grass hay crops which are normally cut some inches above ground level.

Rabbits are at present restricted to south western Queensland where they invade market gardens from adjacent infested grazing areas. Hares, on the other hand, occur in all parts of the State. Both of these rodents feed on the more succulent growth of the plant and attacks can therefore be expected in cultivated crops shortly after the seed

germinates. The damage is usually first noticed at the margin of the field and tends to be most severe in winter and early spring when natural feed is relatively scarce.

Bandicoots are frequently responsible for faulty strikes in maize paddocks on scrub farms. When they are active, innumerable holes will be found along the rows shortly after the crop is sown, and gaps in the seedling stand will be extensive. How far the pest is attracted to the planted area by the seed and how far by the white grubs which commonly occur in scrub soils is a moot point, but, directly or indirectly the bandicoot is the pest and must, consequently, be controlled. Wallabies are also troublesome on scrub farms, particularly when the property is surrounded by standing rainforest. They graze on any young crop to which they find access and sometimes cause a great deal of damage.

CONTROL MEASURES.

Control measures for these pests vary a great deal. Mechanical or chemical barriers may keep them at bay, but, if they live in the crop, poisoning is usually necessary. Nevertheless, all control measures must take into account such factors as the cunning of the rat, the curiosity of the mouse and the shyness of the wallaby, as well as the food preferences of the particular pest and its behaviour in cultivated crops. Considerable skill and experience are therefore required in applying them.

Nest Destruction.

Of the pests under consideration, only the rabbit has community nesting habits which permit centralised control measures. Rabbit burrows are conspicuous and it is sometimes feasible to eradicate all the inmates by fumigation. The most commonly used and most effective fumigant is calcium cyanide, a fine powder which releases the poisonous prussic acid gas on exposure to the air. The commercial form of calcium cyanide is sold as Cyanogas, the powdered form of which is blown into the burrow opening by means of a specially designed power duster. After applying the dust to the burrow system, the entrances are sealed off with soil in order to prevent the gas from escaping.

Mechanical and Chemical Barriers.

Hares and rabbits can often be excluded from vegetable and other valuable crops for a period of four or more weeks by erecting a repellant barrier around the area. Binder twine or fine rope soaked in a bath of creosote or hot tar will serve the purpose if it is tied to pegs and kept six inches above the ground. The pegs should be spaced about six yards apart and the impregnated string pulled tight and attached to each with a half hitch. The corner pegs may require bracing. The barrier must extend beyond the ends of the furrows in order to permit the free movement of implements at the ends of the rows, and a "gate" must be provided to allow the entrance to and exit of teams, &c., from the crop. The period during which such a barrier remains effective varies with both temperature and rainfall and is longer in dry districts than in wet. However, as the crop normally needs protection only during the young stages of growth, such a barrier can be very useful if it is properly erected as soon as the depredations of the pests are observed. More durable, though more expensive protection can of course be given to the crop by erecting a wire netting fence around the area. Such a fence must be pegged to the ground in order to prevent the pests from passing underneath it.

Pests such as rats, rabbits and hares which gnaw the trunks of trees near ground level can be kept away from the plants by galvanized

iron barriers. These barriers must be high enough to prevent the animal from jumping over them and they should lean outwards from the tree. While such barriers may be useful for the protection of a few trees, they are scarcely adapted for large scale control work in orchards or windbreaks during outbreaks of epidemic proportions. The position may then be eased by painting the lower parts of the trunks with a repellant wash containing sulphurized linseed oil. This wash is prepared by heating one gallon of linseed oil in a four gallon drum to a temperature of 470 degrees Fahrenheit when a blueish smoke is given off. The oil is then removed from the fire and 12 ounces of powdered sulphur are gradually stirred into it. The relatively large drum is needed to prevent spillage for foaming takes place when the sulphur is added to the hot oil. After the mixture has cooled, it is brushed onto the trunk of the tree from ground level to a height of two or three feet.

Poison Baits.

The protection of growing plants from animal pests by mechanical or chemical barriers is mainly a temporary expedient and has invariably to be followed by measures designed to reduce the pest population. Poison baits are largely used for this purpose. All baits contain a poison incorporated in a suitable carrier which the pests take readily. Strychnine is the most efficient of the several poisons used for these baits and some of the more commonly used formulae are:—

Coated Grain Bait.—1 oz. powdered strychnine alkaloid; 1 oz. baking soda; 1 teaspoonful saccharine; half a cupful starch; 10 to 25 quarts grain. The bait is suitable for rats, mice and bandicoots.

The first four ingredients are added to one quart of water and heated gently with constant stirring into a thin paste. This paste is then poured over the cereal which is repeatedly turned until every grain is effectively covered. The grain is then spread out in the sun to dry and later distributed in small heaps of a tablespoonful or thereabouts wherever the pest is active. The amount of grain used in the formula depends on the size of the pest; the smaller the animal, the greater the amount of grain. Rolled oats is a particularly good carrier for rat and mice baits but wheat or maize may also be used if they are more readily available. Maize is invariably used in bandicoot infested areas. Coated grain baits are particularly resistant to the weathering effects of rains.

Soaked Grain Bait.—1 oz. strychnine hydrochloride (or sulphate); 4 lb. brown sugar; 10 to 25 quarts grain. This bait is suitable for rats, mice and bandicoots.

The strychnine hydrochloride (or sulphate) and brown sugar are dissolved in half a gallon of boiling water which is then poured over the grain in a suitable vessel. The mixture is heated gently for a few minutes, dried and used immediately in the same way as the coated grain bait.

Dry Grain Bait.—1 oz. powdered strychnine alkaloid; 1 oz. baking soda; 10 to 25 quarts crushed grain. This bait is suitable for rats, mice and bandicoots.

The powdered strychnine and baking soda are first mixed thoroughly and then sifted over the grain as it is being stirred. Heaps of the treated grain are distributed wherever the pest has been feeding. The dry grain bait is not very resistant to weathering and should therefore only be used in fine weather or, alternatively, it should be protected from rain by a suitable cover.

Chaff Baits.—1 oz. strychnine hydrochloride (or sulphate); 20 to 30 lb. lucerne chaff. This bait is suitable for rabbits, hares, and wallabies.

The lucerne chaff is first moistened with water. Two gallons of water in which the prescribed amount of strychnine has been dissolved are then sprinkled over the chaff as it is being turned. As soon as it is prepared, handfuls of the poisoned chaff are distributed along the pads in the field.

Sweet Potato Bait.—$\frac{1}{8}$ oz. powdered strychnine alkaloid; $\frac{1}{2}$ oz. baking soda; 3 quarts sweet potato cubes. This bait is suitable for rats, mice, bandicoots and wallabies.

The sweet potatoes are cut into half inch cubes and when still moist, the mixture of strychnine and baking soda is sifted over the mass as it is being stirred. The treated cubes are distributed in small heaps wherever the pest is active.

The only other baits likely to be used on the farm for the control of animal pests contain phosphorus or thallous sulphate as the toxic ingredient. Yellow phosphorus, the form used in bait formulae, is highly inflammable, and is usually marketed in a paste along with other ingredients such as tallow, molasses and a ground cereal. These commercial pastes are generally mixed with pollard or spread over suitable carriers such as slices of bread before the baits are laid. The manufacturers' directions should be followed in detail. Thallous sulphate baits are marketed only in the fully prepared state for use against rats; the packages containing poisoned grain are distributed throughout the infested area.

The baits must be distributed in places where they can be easily found by the pest. In the case of rabbits, hares and wallabies, they can be laid at intervals along the pads leading into and through the field. With other pests, the baits are scattered through the feeding area in which damage has occurred. Normally, baiting should begin as soon as the damage threatens to become of economic importance.

All baits used for the control of animal pests are very poisonous. They must therefore be used carefully in order to minimize the danger to cattle, horses, sheep and poultry, which should be excluded from the baited area. The position of all baits should be marked with characteristic pegs so that they can be easily located and examined at regular intervals. Such examinations give valuable clues as to the feeding habits of the pest and often suggest modifications in the placing of the baits which will make the control measure more efficient. They also simplify the collection and destruction of the baits at the conclusion of the control work.

The grain carriers used in some rodent and marsupial baits are attractive to birds, and reasonable precautions should therefore be taken to prevent them from finding the baits. Normally birds take little interest in baiting operations if the baits are concealed in sections of tile drains or covered with V-shaped pieces of wood. The former are readily available and the latter can be easily made on the farm; either may be used when the pest implicated in the damage on the farm is a small rodent.

Finally, emphasis must be laid on the fact that strychnine and other poisons must be handled with care. All utensils used in the preparation and distribution of the baits must be thoroughly washed before they are set aside. Unused baits which deteriorate on storage should be destroyed along with any spent baits collected in the field. Baits which can be stored are best kept in sealed and prominently labelled tins.

Black Rot and Black Leg of Cabbage and Cauliflower.

F. W. BLACKFORD, Assistant Research Officer.

BLACK rot is the most frequently encountered disease of the cabbage and cauliflower in Queensland, this bacterial trouble being particularly severe in summer-grown crops of cabbages. Black leg is a fungous disease which is also sometimes present in both these vegetables and, because of the similarity of the control measures recommended for the two diseases, they can appropriately be discussed together.

The most characteristic symptom of black rot is the discolouration of the water-conducting vessels in the stem of an affected plant. These vessels become black in colour and appear as black pin points or—in advanced cases—as a black ring, if the stem is cut across (Plate 93); if it is split longitudinally they appear as black streaks. The bacteria* which cause this disease gain entrance to the water-conducting vessels through the leaves, where, at the point of infection, which is usually near the margin, patches of the leaf-blade dry out and turn brown and papery. Severely affected plants are somewhat stunted and, especially in wet weather, other organisms gain entrance to the heads and a foul-smelling, slimy rot ensues.

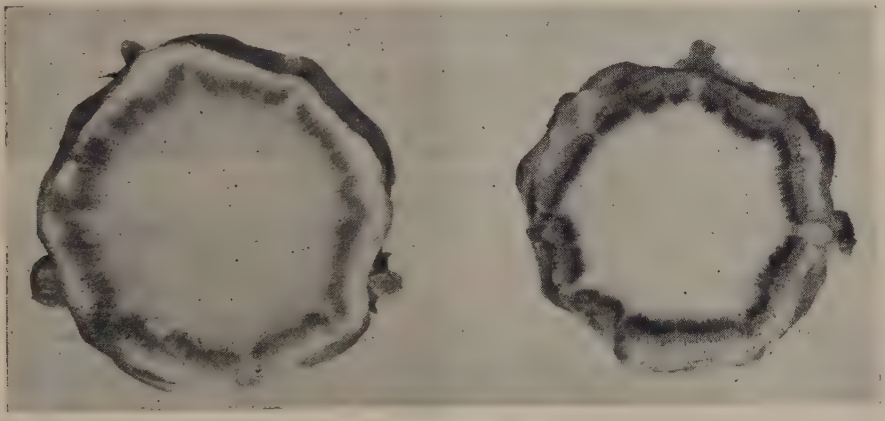


Plate 93.

BLACK ROT OF CABBAGE.—Cross section of the stems of a healthy plant (left) and a diseased plant (right) to show the blackened water-conducting vessels.

The organism which causes black rot may infect the seed both internally and externally and infection of the leaves may take place in the seed-bed by the splashing up of drops of water from the soil which has become contaminated from infected seed. Refuse from previous cabbage or cauliflower crops rotting in the soil may also harbour the parasite for twelve months or more.

The first symptom of black leg to be noticed by growers is generally the failure of certain individual plants to keep pace in growth with the rest of the crop. Close examination of such plants reveals the presence of a black, shrunken area on the stem at ground level. This lesion may extend sufficiently to girdle the stem in which case the plants die. An examination of the seed-bed from which such plants were taken

* *Pseudomonas campestris.*

frequently discloses the presence of the lesion on at least some seedlings and these may be stunted, yellow and occasionally wilted. If seedlings which are only slightly affected—and slight infection is easily overlooked—are planted out, the stems may become severely infected later and an uneven, unsatisfactory crop is the result. The disease affects the leaves and also the seed-heads, if the crop is allowed to seed, and produces brown, dead spots studded with black pin points, which are the spore-bearing bodies of the fungus* causing the disease. The individual spots on the leaves may be up to half an inch in diameter and on the seed-head the disease appears as elongated, shrunken areas on the stems and pods. The seed may be infected from these spots, the fungus even penetrating the outer seed-coat to lie dormant in the internal tissues until the seed is sown. Rotting plant debris in the soil from a diseased crop may also harbour the fungus.

Control.

The first precaution to be adopted in an endeavour to exclude these two diseases from a crop is in the choice of the seed-bed site. This should be on land that has not previously grown cabbages, cauliflowers or turnips and at some distance from land which has produced these crops; if this is not possible, then the soil should be sterilized by heat or chemical treatment. The next step is the adoption of some form of seed treatment in order to eliminate the possibility of introducing the diseases through the medium of infected seed, for in both cases the disease may be carried by the seed.

In the case of black rot, the bacteria causing the trouble are mainly carried externally on the seed-coat and these external bacteria can be dealt with by dipping in a corrosive sublimate solution at a strength of one in one thousand by weight. The seed is enclosed in a loosely-tied cheese cloth or muslin bag and immersed for half an hour, the bag being agitated to dislodge any air bubbles. The seed is then rinsed for five or ten minutes in several changes of clean water, dried in the shade and sown without delay.

This dipping, however, will not dispose of such black rot infection as may occur within the seed, and as the fungous parasite which causes black leg is carried within the seed the corrosive sublimate dipping will be quite ineffective in the case of the latter disease. Hence, even although black leg is much less frequently encountered than black rot, growers may prefer to use the hot water treatment in order to obtain a complete control of seed infection in the case of both diseases, even although it is not so easy of application as corrosive sublimate dipping.

The hot water treatment requires suspension of the seed in hot water for half an hour, the water being kept at 122 degrees Fahrenheit by means of a small flame, both the seed and the water being stirred from time to time. A thermometer costing approximately 5s. is required and the treatment can usually be carried out in a kerosene tin with a wooden lid in which two holes have been made. The thermometer can be inserted in one of these holes and the water and seed can be stirred through the other.

The hot water treatment kills the infection without harming the seed unduly, provided the seed had high vitality originally. Care must be taken to maintain the exact temperature for the stated time because too low a temperature will not kill the parasitic organisms, while too high a temperature will spoil the seed. After dipping, the seed is rinsed in clean, cold water, dried in the shade, and sown without delay.

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* *Phoma lingam.*

Any diseased plants which may appear in the seed-bed in spite of the adoption of the above precautions should be discarded when transplanting, and, if infection is serious—a development which should not occur if the seed-bed precautions have been properly observed—consideration should be given to discarding the whole bed because even such plants as may appear healthy in a heavily infected bed, are nevertheless likely to be infected with the disease producing organisms.

As both diseases will remain in infected leaves, stalk butts and other debris left in the field after a crop has been harvested, all such debris should be gathered up and burned. Any diseased material unavoidably left unburned should be given an opportunity to decompose—thus killing out the disease producing organisms—by planting cabbages, cauliflowers, turnips or allied crops on the same land only once in every three or four years.

Cat. H. Sep

The Protection of Seed Potatoes from Tuber Moth Attacks.

J. HAROLD SMITH, Senior Research Officer.

THE wastage caused by the tuber moth* to potatoes in Queensland is considerable. Though the larvæ mine in the leaves and burrow into the stalk of the plant, their presence apparently does not affect the actual yield of tubers unless dry weather or poor cultural conditions slow down the rate of growth. Non-irrigated crops may suffer some reduction in yield, but irrigated crops grown on a well-prepared soil seldom show any appreciable ill effects, in so far as yield is concerned, from the infestation of leaves and stalks. In all crops, however, damage to the tubers may occur shortly before, or immediately after, harvesting begins. In the former case, the larvæ gain access to the tubers through cracks in the ground. Such attacks are particularly common in shallow rooting varieties, even when deep hilling and late-season waterings are carried out. When the crop is dug, some potatoes are already infested by the larvæ. Further attacks occur when harvesting takes place, for the larvæ leave the haulms and enter any tubers on the ground or in bags in the paddocks. The amount of damage to the tubers in all crops therefore depends on the extent of haulm injury, the variety, the cultural conditions, the incidence of disease and the efficiency or otherwise of harvesting methods. If the tubers are not immediately protected from further attacks when they are dug, the wastage will rapidly increase during storage until most, if not all, are destroyed. The damage to seed potatoes harvested in November and held on the farm for planting in February or March is particularly serious for the eyes may be completely destroyed.

There are several methods of protecting the tubers. If the crop is promptly harvested and the tubers are immediately removed from the field, a thick, straw covering will exclude the moths and keep the tubers in fair order. Some deterioration takes place during storage, however, for the potatoes will not be entirely free from the insect and populations can increase under the cover. Naphthalene liberally distributed in and among the tubers is also of some value for it keeps the moths away from them if the concentration of fumes is great enough.

* *Phthorimæa operculella* Zell.

Neither of the foregoing methods is particularly efficient, and heavy culling of the bulk is necessary when seed for the autumn crop is selected. Much more efficient protection can be obtained by using derris dusts. These dusts are marketed by all firms dealing in insecticides and contain the ground roots of derris or allied plants mixed with talc or some other carrier. Tubers covered with a film of the dust are not attacked by the tuber moth and can be held in perfect condition for some months in moth infested premises. Treatment is a relatively simple matter. Two convenient methods are:—

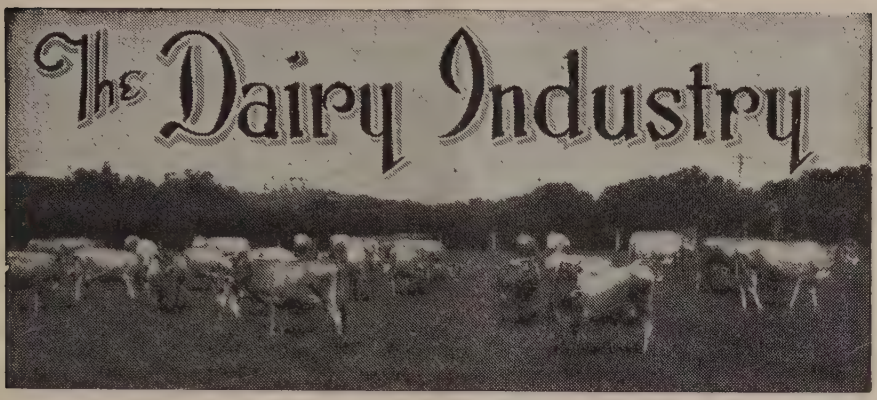
(*a*) Erect an 8 feet by 3 feet sloping bench from T. and G. timber with one end 6 inches higher than the other. Flanges extending 2 inches above the surface of the bench should be fitted at the sides and across part of the lower end in order to confine the tubers to the bench and feed them to the receiving bags. The surface of the bench is then covered with a one-eighth of an inch layer of derris dust. The tubers are tipped on to the bench at the upper end and worked down to the lower end by hand. As the tubers are rolling down the bench, additional dust is thrown over and worked on to them. The dusted tubers can be stored without further treatment until they are required. If the tubers are to be stacked unbagged, they can be fed direct from the bench to the stacking site.

(*b*) The tubers can also be treated in kerosene tins. As the butts of mixed second grade and seed tubers are brought from the field to the barn, the potatoes are emptied into the tins and, after dust treatment, transferred to bags or the storage site. Three or four handfuls of derris dust are thrown into each kerosene tin as it is being filled and, when the tin is emptied, the dust swirls into a cloud which leaves a relatively good film on the surface of each tuber. If the seed tubers are selected during harvesting, they may be treated in the field as they are being bagged.

These and other methods of applying the dust to the potatoes all give efficient protection against tuber moth provided the coverage obtained is reasonably good. The dust should be freely used, particularly as any surplus left on the bench can be repacked and held for use at a later date. Treatment should preferably be carried out within twenty-four hours of harvesting; perhaps the best method is to dust the tubers at the close of each day's work in the field. Approximately 12 lb. to 15 lb. of dust will be needed for the treatment of each ton of seed potatoes.

Derris dusts are non-poisonous and can therefore be used with complete safety. Seed potatoes should always be treated. The dusts may also be used for the protection of table potatoes if these are harvested from heavily infested crops or liable to be stored for some time before reaching the market.

At the present time, derris dusts are available. However, should stocks run short, finely ground magnesite may be used as an alternative in exactly the same way as derris dusts. Magnesite gives quite good protection from tuber moth attacks if the potatoes are stored in dry weather. Under humid conditions, it is much less efficient than a derris dust, and it cannot therefore be depended on to protect seed potatoes held in moth infested premises during the summer months.



Post-War Planning for Dairy Farms.

C. R. TUMMON, Dairy Branch.

THERE is much talk at present of post-war planning and construction, and it is sincerely hoped that the dairy industry, and also the dairy farm, will feature largely in any new scheme. Young people should be encouraged to take on dairy work, which should be recognised as a very scientific business and one which may pay a handsome dividend if capably managed. The following suggestions are put forward as a possible guide to dairy farm planning:—

Careful consideration should be given to planning the dairy, which, briefly, may provide for, as the main principles—

1. The layout and construction of buildings;
2. The farm;
3. The herd.

Layout and Construction of Dairy Premises.

Points to be considered in laying out and building dairy premises—

Selection of suitable site;
Build according to plan;
Concrete floors;
Good drainage;
Water supply;
Equipment—sterilizer, washing-up trough, and other necessary appliances and installations;
Dairy house;
Feed room and feeding stalls.

In selecting the site for dairy buildings, consideration should be given to distance from residence, suitable slope for drainage, and reasonably central position on the farm, in order to facilitate the working of the farm. The bails should be constructed on a slight slope so that in

rainy weather they will rapidly drain and dry. If practicable, bails should face north-east. The aspect may, however, vary according to direction of prevailing winds and rains in each dairy district.

Dairy premises should, of course, be constructed in conformity with Government regulations. These regulations are based on expert knowledge and only made law after they have proved successful in practice. When building the milking shed, it is advisable to provide the necessary air space for machines even if hand-milking is practised, so that no further alteration may be necessary if machines are installed later.

Floors of dairy buildings should be concreted, and, if practicable, the holding-yard as well.

The site and immediate surroundings should be well drained—a concrete drain extending 30 feet from bails is suggested. A narrow concreted race leading away from the bails so that the cows may walk along this after leaving the shed also is advised. This race should run along the front of the milking shed and extend some distance from the shed. If such a race is provided, all the bail doors should open the one way so that the cows can walk out in only one direction.

An ample water supply at the dairy is a very important factor in the production of high-quality dairy products. With plenty of water available, there is no difficulty in observing the required standard of cleanliness of utensils, equipment, and the milking-shed floor.

The installation of a sterilizer is compulsory if milking machines are in use, and is also recommended if hand-milking is practised. With a sterilizer and suitable washing-up trough and draining rack provided, all utensils may be thoroughly cleansed, sterilized, and dried.

A cool, well-constructed, and well-ventilated dairy house is required for the keeping of cream on the farm. It is now permissible for this dairy house to be constructed as an annex to the separator room. This is a saving in expense and makes working more convenient.

Hand-feeding should be practised on every farm where maximum production is required, and it is therefore necessary to have suitable feeding stalls, feed room, and silo in the proximity of other dairy buildings.

The Farm.

Points for consideration in the planning of the layout of a dairy farm are:—

Subdivision;

Stock-proof fences and well-made and well-hung gates;

Pastures;

Pasture improvement;

Shade and water;

Cultivation;

Fodder conservation.

To get the best out of the pastures, the farm should be subdivided into a number of small paddocks, which should contain a variety of grasses. This enables one paddock to be eaten down at a time (known as rotational grazing), prevents pasture destruction by unnecessary

walking by cattle, and provides for the systematic spelling of the paddocks. Also, if several grasses are provided in separate paddocks, they provide variety in feed for the herd. Calf paddocks and a bull paddock and serving yard should also be situated close to the dairy buildings. The bull should always be kept in a bull paddock, so that calving may be controlled on the farm and proper supervision kept over the bull. A crush is indispensable on every dairy farm. Separate isolation paddocks for cows and pigs also are required, in order that any sick animal may be isolated for observation and the risk of spreading infection minimised.

Well-made and well-hung wooden swing gates are a definite asset on any dairy farm. It has often been said that a farmer may be judged by the type of gates on his farm.

When laying down pasture, the grasses chosen should be those which grow well and are otherwise suitable to district conditions. Some grasses are adaptable to certain climates only, and it is no use persevering with them in localities where climatic conditions are not suitable for those particular species.

After pastures have been established for some time, it may be observed that, generally, they decline gradually in value from year to year. This is an indication that renovation is necessary and an effort should be made to improve them. Often fertilizing will restore them to better growth; and where grasses (such as paspalum) become rootbound, it will be found very beneficial if the pasture is broken up, either by ploughing, harrowing, or some such method.

It is a good plan to provide, if practicable, adequate shade and water in each of the paddocks on the farm. Cattle need protection from the mid-day heat in summer, and water should be available to cattle whenever they have the inclination to drink. These factors influence the milk yield considerably.

The practice of depending on grasses alone is not conducive to continuous high milk yields. Land should be cultivated, where practicable, and crops grown to feed the milking herd during the drier periods of the year so that a high rate of production may be maintained throughout the year.

As well as providing crops which may be fed off in the growing stage, it also is sound dairy practice to provide for fodder storage. A silo, therefore, is regarded as a necessity on every dairy farm. Various silo types are discussed and particulars of the construction given in *The Queensland Agricultural and Pastoral Handbook*, volume I. The stacking of hay is a cheap and useful method of conserving fodder.

The Herd.

In establishing a dairy herd, the best foundation stock available should be obtained. Points to be considered are:—

Selection of breed;

Methods of improving production;

Maintenance of health in the herd.

After deciding the breed of dairy cattle he prefers, the farmer's aim should be to gradually work up to a uniform type of high-producing animals. All breeds of dairy cattle have their desirable and undesirable characteristics, and in these notes there is no attempt to influence any farmer in his choice of any particular breed. However, if practicable, cross-bred animals should not be selected, because, although they themselves on the first cross are quite likely to be excellent producers, their progeny more often than not are not up to the same standard.

Improved production may be brought about by concentrating on the following factors:—Feeding, breeding, testing, and culling. No matter how well bred a dairy herd may be, the highest milk yield cannot be obtained if the necessary food to make the milk is unavailable to the cows. The natural pastures are usually sufficient for the herd's requirements during the warm, wet months of the year. During winter and dry periods of the year, however, an ample supply of conserved fodder should be available for feeding the dairy herd. This not only keeps up maximum yields throughout the year, but also keeps the herd in good condition, of which the advantages are obvious.

It should be recognised that the bull is the most important animal in the herd. As half of the bull's breeding is inherited by the progeny, it is quite evident why this animal is so important. Because of this, therefore, no effort or expense should be spared in obtaining a suitable, well-bred sire for the herd. As only experienced breeders can afford to practice in-breeding, this is not recommended to the average farmer. Frequent changes in sires are required therefore, but the successive sires used should belong to one blood line, in order to attain uniformity of type in the herd. It is useless trying to select the best cows in the herd from which to breed, unless their capacity for production has been estimated by the Babcock test. Every farmer should test his cows systematically for butter-fat production and eliminate gradually those giving the lowest yield, retaining calves only from cows of high production and suitable type.

The farmer should always be on the lookout for sickness or disease among his herd. When an animal is observed to be sick, it should be separated from the rest of the herd, in case the sickness is of a contagious nature. It is wise for the farmer to acquire a knowledge of treatment of the most common ailments of stock. Care should be exercised when introducing any fresh stock to the herd, to ensure that only healthy animals are purchased. A veterinary first-aid chest is desirable on every farm. It should contain at least two clinical thermometers, inoculating syringe and needle, large syringe, drenches, and a few other essential veterinary requisites.

It is not suggested that all the planning as outlined could be put into effect in a short time, but it is hoped that farmers will keep this in mind as an aim which they should endeavour to attain as quickly as possible if they intend to make their work a pleasure and dairying more profitable business.

Queensland Butter Production, 1943-44.

E. B. RICE.

THE accompanying tables cover the operations of all butter factories for the year ended 30th June, 1944. The information contained therein has been compiled and tabulated from monthly returns in accordance with the requirements of *The Dairy Produce Act*.

A scrutiny of the figures indicates the quantity of butter in each grade made by the respective factories, and the quantity of butter in each grade for which suppliers were paid. The official gradings columns indicate the results of the gradings of butter examined officially by both Commonwealth and State officers. The information contained in these tables is of particular interest to suppliers, as well as to factory managements and directorates.

SUMMARY OF PRODUCTION AND GRADINGS OF BUTTER FOR THE YEAR ENDED 30TH JUNE, 1944.

MANUFACTURE IN LB.

Total.	Choice.	First.	Second.	Pastry.
101,416,297	67,537,899	30,897,327	2,922,282	58,789

PAY IN LB.

101,696,921	69,398,737	29,870,469	2,410,717	16,998

OVER-RUN.

Actual	.. ..	2,852,392 = 2·89%
Paid	.. ..	3,133,016 = 3·08%

GRADINGS IN BOXES.

Submitted as :—

Choice.	Choice.	First.	Second.	Pastry.
847,265	680,597	165,859	752	57
..	80·32%	19·57%	·08%	·03%
First				
418,898	..	407,389	11,418	91
		97·24%	2·72%	·04%
Second.				
52,846	..	..	47,150	5,696
	..	..	89·24%	10·76%
1,319,009	680,597	573,248	59,320	5,844
	51·6%	43·4%	4·4%	·6%

Percentage of Production Graded=72·84%

PRODUCTION, PAYMENTS, AND GRADINGS OF BUTTER IN QUEENSLAND, FOR THE YEAR ENDED 30TH JUNE, 1944

Factory.		Manufacture and Payments in Lb.					Overrun.		Make Graded.
		Total.	Choice.	First.	Second.	Pastry.	Actual.	Paid.	Per Cent.
Atherton	Make	1,379,655	1,379,655	..	..	..	46,078	47,800	..
	Pay	1,381,377	1,381,377	..	..	..	3·45%	3·58%	
Bushy Creek	Make	55,102	..	55,102	..	..	851	891	..
	Pay	55,142	..	55,142	..	..	1·57%	1·64%	
Caboolture	Make	2,228,526	1,978,672	243,421	6,433	..	73,859	73,842	78·04
	Pay	2,228,509	2,007,331	212,627	8,551	..	3·43%	3·43%	
Eumundi	Make	2,107,575	1,915,115	186,773	5,687	..	65,730	63,728	95·04
	Pay	2,105,573	1,954,187	148,631	2,755	..	3·22%	3·12%	
Pomona	Make	1,556,385	1,414,283	138,548	3,554	..	37,526	37,647	92·31
	Pay	1,556,506	1,457,227	97,011	2,268	..	2·47%	2·47%	
Chinchilla	Make	1,781,213	1,233,309	459,424	83,720	4,760	45,783	43,624	92·57
	Pay	1,779,054	1,273,235	447,656	58,163	..	2·63%	2·51%	
Daintree	Make	126,144	29,882	96,262	..	..	2,749	2,715	..
	Pay	126,110	29,054	97,056	..	..	2·22%	2·20%	
Dayboro'	Make	93,084	..	93,084	..	..	..	..	44·4
	Pay	..	..	..	..	..	..	..	
Toowoomba	Make	2,328,807	1,796,247	468,496	64,064	..	64,907	71,468	46·18
	Pay	2,335,368	1,787,897	485,025	62,446	..	2·86%	3·15%	
Clifton	Make	1,201,872	871,640	325,640	4,592	..	30,260	30,452	84·50
	Pay	1,202,064	868,793	328,599	4,672	..	2·58%	2·59%	

OFFICIAL GRADINGS IN BOXES.

Factory.	Submitted as Choice.					Submitted as First.				Submitted as Second.		
	Total.	Choice.	First.	Second.	Pastry.	Total.	First.	Second.	Pastry.	Total.	Second.	Pastry.
Atherton	..	..	..	..	..	..	..	..	..	..	..	..
Bushy Creek ..	..	..	..	..	..	..	..	..	..	..	..	..
Caboolture ..	27,078	25,980 95·94%	1,098 4·06%	..	..	3,913	2,385 60·95%	1,528 39·05%	..	67	60 89·55%	7 10·45%
Eumundi	32,025	16,641 51·96%	15,384 48·04%	..	..	3,594	3,032 84·36%	562 15·64%	..	149	149 100·0%	..
Pomona	23,062	20,227 87·707%	2,835 12·29%	..	..	2,456	2,184 88·92%	272 11·08%	..	137	85 62·04%	52 37·96%
Chinchilla	20,017	9,458 47·24%	10,559 52·76%	..	..	7,916	7,445 94·05%	471 5·95%	..	1,511	1,047 69·29%	464 30·71%
Daintree	..	..	..	..	..	..	..	..	..	..	..	..
Dayboro'	739	...	716 96·88%	23 3·12%	..	..	..	..	..	..	..	..
Toowoomba ..	9,962	9,951 99·88%	11 ·12%	..	..	8,186	8,142 99·46%	44 ·54%	..	969	956 98·66%	13 1·34%
Clifton	12,701	12,292 96·78%	409 3·22%	..	..	5,334	5,334 100·0%	..	..	101	70 69·306%	31 30·69%

PRODUCTION, PAYMENTS, AND GRADINGS OF BUTTER IN QUEENSLAND, FOR THE YEAR ENDED 30TH JUNE, 1944—*continued.*

Factory.	Manufacture and Payments in Lb.						Overrun.		Make Graded.
		Total.	Choice.	First.	Second.	Pastry.	Actual.	Paid.	Per Cent.
Crow's Nest	Make	1,530,480	1,226,344	243,544	60,592	..	44,606	44,619	94·75
	Pay	1,530,493	1,226,265	243,590	60,638	..	3·0%	3·0%	
Dalby	Make	2,983,138	1,519,802	1,394,904	68,432	..	91,532	90,522	93·38
	Pay	2,982,128	1,513,953	1,408,833	59,342	..	3·16%	3·13%	
Goombungee	Make	1,587,712	778,848	806,792	2,072	..	55,004	55,085	96·87
	Pay	1,587,793	778,211	807,582	2,000	..	3·58%	3·59%	
Jandowae	Make	2,283,008	1,354,696	909,496	18,816	..	75,867	75,891	88·58
	Pay	2,283,032	1,359,797	904,894	18,341	..	3·43%	3·43%	
Miles	Make	1,125,488	166,320	903,056	56,112	..	41,648	41,924	85·03
	Pay	1,125,764	167,572	904,880	53,312	..	3·84%	3·86%	
Esk	Make	2,036,274	1,028,542	943,259	64,473	..	69,247	69,007	86·42
	Pay	2,036,034	1,028,749	950,432	56,853	..	3·52%	3·5%	
Evelyn	Make	147,475	147,475	..	..	..	2,233	2,816	..
	Pay	148,058	148,058	..	..	..	1·53%	1·92%	
Gayndah	Make	1,624,051	1,407,611	200,648	15,792	..	66,679	67,117	46·8
	Pay	1,624,489	1,393,607	215,909	14,973	..	4·28%	4·3%	
Killarney	Make	1,232,479	715,400	458,450	58,629	..	27,859	26,590	59·88
	Pay	1,231,210	714,166	472,429	44,615	..	2·31%	2·2%	
Logan and Albert ..	Make	2,934,474	2,516,322	418,152	..	..	89,865	90,049	94·31
	Pay	2,934,658	2,546,185	386,984	1,489	..	3·15%	3·16%	

OFFICIAL GRADINGS IN BOXES—*continued.*

Factory.	Submitted as Choice.					Submitted as First.				Submitted as Second.		
	Total.	Choice.	First.	Second.	Pastry.	Total.	First.	Second.	Pastry.	Total.	Second.	Pastry.
Crow's Nest ..	20,523	17,718 86·33%	2,798 13·63%	7 ·03%	..	4,327	4,089 94·49%	238 5·51%	..	1,045	1,016 97·22%	29 2·78%
Dalby	24,891	23,257 93·43%	1,613 6·48%	21 ·09%	..	23,658	23,404 98·92%	254 1·08%	..	1,197	1,081 90·309%	116 9·69%
Goombungee ..	13,133	11,417 86·93%	1,716 13·07%	..	..	14,294	14,279 99·89%	15 ·11%	..	37	37 100·0%	..
Jandowae	19,984	17,686 88·50%	2,275 11·38%	23 ·11%	..	15,847	15,721 99·204%	126 ·79%	..	283	270 95·4%	13 4·6%
Miles	1,709	1,536 89·87%	173 10·13%	..	..	14,116	14,116 100·0%	..	..	1,002	819 81·73%	183 18·26%
Esk	18,179	15,494 85·23%	2,685 14·77%	..	..	12,104	11,985 99·01%	119 ·99%	..	1,142	1,116 97·71%	26 2·29%
Evelyn	..	..	..	..	..	..	..	..	..	..	..	..
Gayndah	9,930	8,946 90·09%	984 9·91%	..	..	3,340	3,072 91·97%	268 8·03%	..	303	252 83·16%	51 16·84%
Killarney	5,060	2,720 53·75%	2,340 46·25%	..	..	7,188	7,179 99·87%	9 ·13%	..	930	930 100·0%	..
Logan and Albert..	42,055	36,780 87·45%	5,251 12·48%	24 ·07%	..	7,365	6,823 92·65%	542 7·35%	..	..	..	..

PRODUCTION, PAYMENTS, AND GRADINGS OF BUTTER IN QUEENSLAND, FOR THE YEAR ENDED 30TH JUNE, 1944—*continued.*

Factory.		Manufacture and Payments in Lb.					Overrun.		Make Graded.
		Total.	Choice.	First.	Second.	Pastry.	Actual.	Paid.	Per Cent.
Maleny	Make	2,339,166	2,281,766	57,400	..	..	70,972	71,629	91·56
	Pay	2,339,823	2,292,332	46,624	867	..	3·12%	3·15%	
Maryborough	Make	870,836	590,320	260,433	20,083	..	21,543	22,296	..
	Pay	871,589	587,898	263,511	20,180	..	2·53%	2·62%	
Biggenden	Make	1,878,407	1,508,079	370,328	..	..	70,711	67,204	42·24
	Pay	1,874,900	1,558,264	316,590	46	..	3·91%	3·71%	
Kingaroy	Make	3,854,318	3,744,166	..	110,152	..	200,316	200,052	31·48
	Pay	3,854,054	3,766,783	..	87,271	..	5·48%	5·47%	
Mundubbera	Make	2,612,968	2,379,224	195,048	38,696	..	104,378	105,123	70·94
	Pay	2,613,713	2,411,636	176,612	25,465	..	4·16%	4·19%	
Wondai	Make	2,459,205	1,940,563	464,072	54,570	..	89,620	90,586	71·69
	Pay	2,460,171	1,984,780	441,317	34,074	..	3·78%	3·82%	
Millaa Millaa	Make	501,658	500,202	..	1,456	..	12,227	10,768	..
	Pay	500,199	498,759	..	1,440	..	2·49%	2·2%	
Milmerran	Make	1,301,821	190,368	778,151	299,478	33,824	30,991	31,136	85·95
	Pay	1,301,966	257,934	779,084	264,948	..	2·43%	2·45%	
Nanango	Make	2,220,324	868,204	1,281,672	70,448	..	70,347	70,250	50·71
	Pay	2,220,227	1,214,971	964,033	41,223	..	3·27%	3·26%	
Oakey	Make	3,379,256	2,610,376	534,576	232,120	2,184	113,208	110,313	94·09
	Pay	3,376,361	2,617,756	568,227	190,378	..	3·46%	3·37%	

OFFICIAL GRADINGS IN BOXES—*continued.*

Factory.	Submitted as Choice.					Submitted as First.				Submitted as Second.		
	Total.	Choice.	First.	Second.	Pastry.	Total.	First.	Second.	Pastry.	Total.	Second.	Pastry.
Maleny	37,220	27,907 74·97%	9,313 25·03%	..	..	1,025	992 96·77%	33 3·23%	..	..	..	..
Maryborough ..	..	..	..	..	..	378	305 80·68%	73 19·32%	..	267	65 24·34%	202 75·66%
Biggenden ..	7,806	5,940 76·09%	1,866 23·91%	..	..	6,364	5,850 91·92%	514 8·08%	..	..	..	..
Kingaroy	19,769	19,581 99·05%	188 ·95%	..	..	187	78 41·71%	109 58·29%	..	1,711	1,546 90·35%	165 9·65%
Mundubbera ..	28,854	25,621 88·79%	3,233 11·21%	..	..	3,493	2,545 72·86%	897 25·68%	51 1·46%	752	661 87·89%	91 12·11%
Wondai ..	22,371	15,112 67·54%	7,259 32·46%	..	..	8,310	7,588 91·31%	722 8·69%	..	801	720 89·88%	81 10·12%
Millaa Millaa ..	..	..	..	..	..	..	..	..	..	..	..	..
Milmerran ..	1,852	555 29·96%	1,297 70·04%	..	..	12,334	12,012 97·38%	332 2·62%	..	5,795	4,855 83·78%	940 16·21%
Nanango	13,081	10,194 77·92%	2,816 21·52%	36 ·28%	35 ·28%	16,241	15,706 96·705%	495 3·04%	40 ·25%	1,277	1,033 80·89%	244 19·11%
Oakey	41,499	33,534 80·806%	7,965 19·194%	..	..	8,185	8,185 100·0%	..	..	4,095	4,056 99·04%	39 ·96%

PRODUCTION, PAYMENTS, AND GRADINGS OF BUTTER IN QUEENSLAND, FOR THE YEAR ENDED 30TH JUNE, 1944—*continued.*

Factory.		Manufacture and Payments in Lb.					Overrun.		Make Graded.
		Total.	Choice.	First.	Second.	Pastry.	Actual.	Paid.	Per Cent.
Gladstone	Make	1,505,665	467,029	1,015,789	22,847	..	31,059	32,764	73·97
	Pay	1,507,370	486,042	1,003,687	17,580	61	2·1%	2·22%	
Biloela	Make	3,361,062	1,173,411	2,114,913	72,738	..	111,078	111,680	50·01
	Pay	3,361,664	1,172,263	2,136,039	53,362	..	3·41%	3·43%	
Bundaberg	Make	1,877,657	666,403	1,198,410	12,844	..	33,835	39,295	54·21
	Pay	1,883,117	674,983	1,192,909	15,192	33	1·83%	2·13%	
Mackay	Make	634,691	226,044	391,178	..	17,469	U/r 5,822	22,295	..
	Pay	662,808	248,591	398,261	..	15,956	·91%	3·48%	
Monto	Make	3,921,096	1,518,155	2,289,616	113,325	..	85,625	86,397	72·35
	Pay	3,921,868	1,533,844	2,290,543	97,481	..	2·23%	2·25%	
Rockhampton	Make	1,738,406	222,759	1,450,693	64,954	..	41,978	49,927	..
	Pay	1,746,355	238,427	1,454,000	53,928	..	2·47%	2·94%	
Wowan	Make	2,485,430	860,588	1,564,953	59,889	..	66,196	66,907	46·96
	Pay	2,486,141	857,689	1,579,057	49,395	..	2·73%	2·76%	
Q.A.H.S.	Make	52,080	36,624	15,456	..	..	U/r 25,245	1,505	44·52
	Pay	78,830	74,797	3,735	298	..	3·26%	1·94%	
Booval	Make	3,081,313	1,986,067	926,322	168,700	224	81,461	86,769	57·92
	Pay	3,083,621	1,858,238	1,101,593	123,790	..	2·81%	2·89%	
Boonah	Make	3,364,195	2,081,496	1,175,086	107,613	..	123,139	123,049	93·16
	Pay	3,364,105	2,159,939	1,128,038	76,128	..	3·79%	3·79%	

OFFICIAL GRADINGS IN BOXES—*continued.*

Factory.	Submitted as Choice.					Submitted as First.				Submitted as Second.		
	Total.	Choice.	First.	Second.	Pastry.	Total.	First.	Second.	Pastry.	Total.	Second.	Pastry.
Gladstone	4,783	4,491 93·89%	292 6·1%	..	..	14,199	14,159 99·72%	40 ·28%	..	907	895 98·68%	12 1·32%
Biloela	6,151	6,067 98·63%	84 1·36%	..	..	22,692	22,366 98·56%	326 1·43%	..	1,174	1,124 95·74%	50 4·26%
Bundaberg ..	3,111	2,833 91·06%	278 8·94%	..	..	14,769	14,769 100·0%	..	..	296	296 100·0%	..
Mackay	..	..	..	..	..	..	..	..	..	125	..	125 100·0%
Monto	18,047	17,847 98·89%	200 1·11%	..	..	30,604	29,880 97·63%	724 2·36%	..	2,006	1,931 96·26%	75 3·74%
Rockhampton ..	..	..	..	..	..	71	71 100·0%	..	..	1,017	342 33·63%	675 66·37%
Wowan	4,272	4,227 98·95%	45 1·05%	..	..	15,459	15,432 99·82%	27 ·17%	..	1,110	1,093 98·47%	17 1·53%
Q.A.H.S.	138	34 24·63%	100 72·46%	4 2·91%	..	276	276 100·0%	..	..	..	..	..
Booval	14,271	8,600 60·26%	5,671 39·74%	..	..	14,316	14,023 97·95%	293 2·05%	..	3,285	2,304 70·13%	981 29·87%
Boonah	32,278	15,849 49·101%	16,080 49·82%	349 1·07%	..	21,151	20,927 98·94%	224 1·06%	..	2,535	2,433 95·97%	102 4·03%

PRODUCTION, PAYMENTS, AND GRADINGS OF BUTTER IN QUEENSLAND, FOR THE YEAR ENDED 30TH JUNE, 1944—*continued.*

Factory.		Manufacture and Payments in Lb.					Overrun.		Make Graded.
		Total.	Choice.	First.	Second.	Pastry.	Actual.	Paid.	Per Cent.
Grantham	Make	2,065,407	1,502,837	452,138	110,432	..	71,865	71,861	92·05
	Pay	2,065,403	1,546,123	426,151	93,129	..	3·6%	3·6%	
Laidley	Make	1,792,146	1,335,075	416,270	40,801	..	58,088	58,060	95·71
	Pay	1,792,118	1,339,367	418,571	34,180	..	3·34%	3·34%	
Lowood	Make	704,501	260,415	399,304	44,782	..	22,260	22,307	85·11
	Pay	704,548	250,004	411,997	42,547	..	3·26%	3·26%	
Roma	Make	836,115	..	590,723	245,392	..	30,004	30,088	55·04
	Pay	836,199	226,960	400,005	209,111	123	3·72%	3·73%	
Silkwood	Make	34,685	..	34,357	..	328	U/r 75	..	..
	Pay	34,760	..	33,935	..	825	·21%	..	
Murgon	Make	2,597,837	1,718,469	876,008	3,360	..	84,204	83,856	80·41
	Pay	2,597,489	2,069,444	526,243	1,802	..	3·34%	3·33%	
Proston	Make	1,334,587	983,411	326,480	24,696	..	29,582	30,092	93·27
	Pay	1,335,097	1,018,342	295,899	20,856	..	2·26%	2·3%	
Kingston	Make	4,166,792	2,537,248	1,428,000	201,544	..	126,287	125,395	91·96
	Pay	4,165,900	2,646,149	1,364,797	154,954	..	3·12%	3·1%	
Woodford	Make	1,435,775	1,259,411	176,364	..	..	30,956	31,452	94·34
	Pay	1,436,271	1,246,843	189,428	..	..	2·2%	2·24%	
Warwick	Make	1,742,335	1,278,467	386,713	77,155	..	47,675	46,596	54·35
	Pay	1,741,256	1,204,863	469,426	66,967	..	2·81%	2·74%	

OFFICIAL GRADINGS IN BOXES—*continued.*

Factory.	Submitted as Choice.					Submitted as First.				Submitted as Second.		
	Total.	Choice.	First.	Second.	Pastry.	Total.	First.	Second.	Pastry.	Total.	Second.	Pastry.
Grantham ..	24,249	9,171 37·82%	15,078 62·18%	..	..	7,719	7,400 95·86%	319 4·14%	..	1,982	1,950 98·38%	32 1·62%
Laidley	22,526	18,220 80·88%	4,306 19·12%	..	..	7,339	7,251 98·8%	88 1·2%	..	764	707 92·53%	57 7·47%
Lowood	3,750	2,952 78·72%	798 21·28%	..	..	6,452	6,370 98·72%	82 1·28%	..	505	505 100·0%	..
Roma	85	..	85 100·0%	..	..	3,751	3,723 99·25%	28 ·75%	..	4,382	4,354 99·36%	28 ·64%
Silkwood	..	..	..	..	..	..	..	..	..	..	..	..
Murgon	24,705	18,816 76·16%	5,889 23·84%	..	..	12,511	12,439 99·42%	72 ·58%	..	86	79 91·86%	7 8·14%
Proston	17,062	10,139 59·43%	6,827 40·01%	96 ·56%	..	4,726	4,551 96·29%	175 3·71%	..	441	420 95·23%	21 4·77%
Kingston	46,382	40,197 86·66%	6,185 13·34%	..	..	18,608	18,438 99·08%	170 ·92%	..	3,433	3,414 99·45%	19 ·55%
Woodford	21,729	13,605 62·61%	8,124 37·39%	..	..	2,460	2,437 99·07%	23 ·93%	..	..	..	..
Warwick	9,017	7,226 80·13%	1,700 18·85%	91 1·02%	..	6,483	6,380 98·41%	103 1·59%	..	1,411	1,324 93·83%	87 6·17%

PRODUCTION, PAYMENTS, AND GRADINGS OF BUTTER IN QUEENSLAND, FOR THE YEAR ENDED 30TH JUNE, 1944—*continued.*

Factory.		Manufacture and Payments in Lb.					Overrun.		Make Graded.
		Total.	Choice.	First.	Second.	Pastry.	Actual.	Paid.	Per Cent.
Allora	Make	1,398,196	1,149,268	244,662	4,266	..	38,946	39,551	60·79
	Pay	1,398,801	1,151,591	242,075	5,135	..	2·86%	2·9%	
Inglewood	Make	483,941	217,157	189,392	..	..	15,171	15,569	78·65
	Pay	484,339	190,812	219,667	73,860	..	3·23%	3·32%	
Texas	Make	286,997	214,788	42,081	30,128	..	9,561	9,617	..
	Pay	287,053	164,398	94,368	28,287	..	3·44%	3·46%	
Cooroy	Make	1,736,928	1,283,104	441,056	12,768	..	55,896	56,304	93·94
	Pay	1,737,336	1,396,421	333,158	7,757	..	3·32%	3·34%	
Gympie	Make	7,017,559	6,466,242	464,632	86,685	..	177,099	176,536	93·83
	Pay	7,016,996	6,583,378	364,950	68,668	..	2·59%	2·58%	

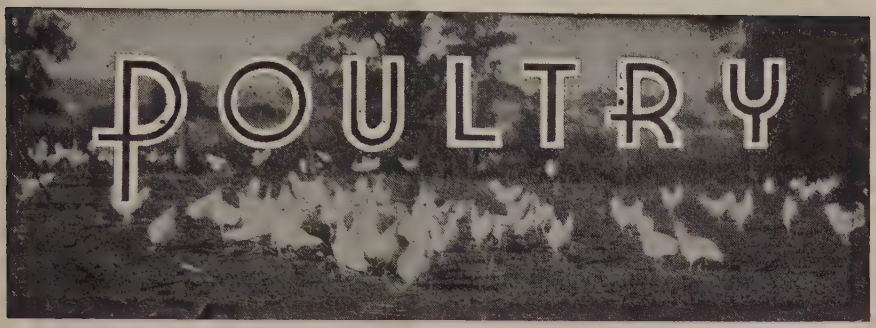
OFFICIAL GRADINGS IN BOXES—*continued.*

Factory.	Submitted as Choice.					Submitted as First.				Submitted as Second.		
	Total.	Choice.	First.	Second.	Pastry.	Total.	First.	Second.	Pastry.	Total.	Second.	Pastry.
Allora	10,247	7,252 70·77%	2,995 29·23%	..	..	4,863	4,632 95·24%	231 4·76%	..	69	69 100·0%	..
Inglewood ..	1,825	1,435 78·63%	390 21·37%	..	..	3,704	3,639 98·24%	65 1·76%	..	1,268	1,115 87·93%	153 12·07%
Texas	..	..	..	..	..	757	702 92·73%	55 7·27%	..	448	373 83·25%	75 16·75%
Cooroy	21,146	17,859 84·45%	3,187 15·07%	78 ·3%	22 ·18%	7,748	7,748 100·0%	..	..	243	203 83·53%	40 16·47%
Gympie	107,991	105,230 97·44%	2,761 2·56%	..	..	8,085	7,325 90·59%	760 9·41%	..	1,510	1,117 73·97%	393 26·03%

PRODUCTION RECORDING.

List of cows and heifers officially tested by Officers of the Department of Agriculture and Stock, which have qualified for entry into the Advanced Register of the Herd Books of the Australian Illawarra Shorthorn Society and the Jersey Cattle Society. Production records for which have been compiled during the month of September, 1944 (273 days unless otherwise stated).

Name of Cow.	Owner.	Milk Production.	Butter Fat.	Sire.
		Lb.	Lb.	
AUSTRALIAN ILLAWARRA SHORTHORNS.				
SENIOR, 3 YEARS (STANDARD 290 LB.).				
Jamberoo Reddy 7th	M. J. Brosnan, Clifton	9,139·75	368·181	Greyleigh Valiant
JUNIOR, 3 YEARS (STANDARD 270 LB.).				
Alfavale Model 19th	W. H. Thompson, Nanango	11,655·25	541·326	Penrhos Pansy's Pride
Alfavale Model 20th	W. H. Thompson, Nanango	9,978·0	407·006	Penrhos Pansy's Prade
Alfavale Judy 11th	W. H. Thompson, Nanango	9,448·5	361·157	Reward of Fairfield
JUNIOR, 2 YEARS (STANDARD 230 LB.).				
Alfavale Model 23rd	W. H. Thompson, Nanango	10,203·6	434·988	Penrhos Pansy's Pride
Bunya View Duchess	W. Caldwell, Bell	7,283·8	318·491	Trevor Hill Reflection
JERSEY.				
JUNIOR, 4 YEARS (STANDARD 310 LB.).				
Strathdean Dora	S. H. Caldwell, Bell	4,931·0	315·403	Navua Ladora's Ruler
SENIOR, 3 YEARS (STANDARD 290 LB.).				
Kathleigh Shamrock	W. Greisheimer, Leyburn	6,049·65	346·696	Retford King's Thorn
Kathleigh Lady Bell	W. Greisheimer, Leyburn	6,869·55	340·559	Banyule Senor
Strathdean Rosie (188 days)	S. H. Caldwell, Bell	4,570·6	304·565	Navua Ladora's Ruler
JUNIOR, 3 YEARS (STANDARD 270 LB.).				
Strathdean Daffodil (247 days)	S. H. Caldwell, Bell	5,746·39	362·374	Langside Pattibelle Dreamer 2nd
SENIOR, 2 YEARS (STANDARD 250 LB.).				
Strathdean Fortune (248 days)	S. H. Caldwell, Bell	4,950·46	311·39	Navua Ladora's Ruler
Bellgarth Opal 4th	D. R. Hutton, Cunningham	4,990·0	260·584	Carnation Fairlad
JUNIOR, 2 YEARS (STANDARD 230 LB.).				
Hocknell Waimate Babette	N. C. Webb, Beaudesert	6,599·8	331·779	Hocknell Golden Surprise



Economies in Production.

R. E. SYMES, Poultry Inspector.

THERE are instances of errors in management which are so noticeable that with a little perception they may be detected and promptly remedied.

What is required is a keen sense of observation which may be acquired by perseverance, so that the simpler sources of loss may be observed and eliminated. The ability to develop this faculty is one of the principal factors in determining the success or failure in poultry raising.

Food Wastage.

The most important problem of the poultry raiser to-day is that of fodder. No one can afford to waste or misuse the limited supplies available.

One of the principal forms of wastage which can easily be corrected is that caused by the use of badly-constructed feed hoppers. The spilling of mash from hoppers is not only the cause of loss of much of the food, but what is spilt becomes contaminated and this contaminated food is often the source of spread of infection when consumed by birds. Farmers who notice wastage from their hoppers and who desire to replace them with more efficient types may obtain from the Department of Agriculture illustrations of suitable feeding equipment.

The foodstuffs which are available should be used for the feeding of the best layers: it is necessary, therefore, to cull. Some poultry farmers regard culling as a duty which should be performed, at least, once annually. Every non-producer represents a waste and it is essential to be on the lookout continuously for possible sources of loss of profit. Culling, therefore, should be a continuous practice performed regularly and ruthlessly. Any bird which does not come into lay within seven months has either been badly reared or is lacking in the capacity for profitable egg production. Culling was dealt with in the October Journal.

Another big wastage of food can be caused by rats. With large quantities of food easily reached, the rat finds the poultry farm an ideal hunting ground. If poultry farmers could only be shown the enormous losses caused by rodents they would take effective steps to

exterminate them. When putting down concrete floors for poultry houses, a wall 5 inches thick and extending down to at least 24 inches below ground level should be constructed, so that rats cannot burrow under the floor to colonise there. The building of sheds which have hardwood floors on stumps is also a way of reducing the possibility of harbouring rats. If rats are found in the feed shed, no effort should be spared to trap or otherwise exterminate them.

If conditions on a poultry farm are such that food wastage caused by faulty hoppers or rats cannot be prevented by the construction of different types of hoppers or the extermination of rats, then the poultry raiser is recommended to change his system of feeding to that of wet mash and grain. With this system, the only food available to rats will be confined to a feed shed where the rats may be more easily dealt with.

Other Causes of Loss.

Other causes of loss are broken eggs and deterioration in quality. The number of eggs which do not reach the market because of breakage has a marked effect on the income of the farmer. Frequent collection of eggs will save losses through breakage, and also enable quick detection of broodies which should be immediately removed. Collecting the eggs as frequently as possible also reduces the risk of staining of eggs through contact with excreta and other material. The method of construction and location of nests also has a bearing on the cleanliness and absence of breakage of eggs. Nests should be deep and the entrance only sufficiently wide to enable birds to enter without difficulty. They should face away from the light. Birds like quietness and darkness when they are laying; if the nests are so arranged, the pullets will take to them naturally instead of laying on the floor with the almost certain loss of eggs through breakage. The nests should be filled to a depth of 3 inches with shell grit, shavings, straw or some other suitable litter. Among white leghorns, the trouble of broken eggs through broodies monopolising the nests is not so great as is the case with some heavy breeds. Careful breeding of Australorps has gone a long way towards eliminating the broody tendency, but some strains still exhibit this characteristic. Unless the broody hen is promptly removed from the nest, there is sure to be some jostling by other birds anxious to enter the nest, and during the dispute as to occupation rights some eggs will undoubtedly become broken. This is the signal for all birds in the vicinity to rush in to eat, if they can, the broken egg.

Parasitic infestation is another source of leakage of profits. Worms are often found in pullets and other young stock. Usually, they are not in sufficient numbers to seriously affect the health of the bird, but they do tend to lower their resistance to disease. In some cases, however, fowls are so badly infested that worms are responsible for heavy losses and some mortality. In such cases treatment is necessary. Infestation is acquired from floors and yards which have become contaminated with eggs which have developed to the infective stage. All floors and yards should be kept clean and dry. Worm infestation is most likely from yards in damp situations. Where birds are allowed out of the house, care should be taken that the ground is well drained.

One of the advantages of the intensive system is the reduced liability to trouble from worm infestation, as compared with flocks which are permitted to run in yards.

Fowl pox is another preventable loss. Many poultry farmers are troubled every year with outbreaks of fowl pox among their birds. Fowl pox is not usually a serious disease from the point of view of actual number of deaths which occur, but it does have a serious effect on the condition of the growing stock which it attacks. Even a mild infection causes birds to become indifferent to food and usually brings about a false moult and so egg production is delayed. Fowl pox is preventable, so this is a cause of loss which can be definitely stopped. If chickens are vaccinated with fowl pox vaccine at an early age, they will become immune to chickenpox and much disappointment will be saved the raiser of young stock. As an insurance against wastage from this disease vaccination is suggested.

Overcrowding of chickens is another source of serious losses each year. If it were possible to ascertain the number of pullets raised in comparison with the number of chicks produced, it would provide a startling illustration of one of the ways in which poultry profits are lost. While a lot of chicken losses are caused by coccidiosis or pullorum disease, a very large proportion of the losses are directly caused by overcrowding. Crowding in the brooder house, around the hover, or at the drinking fountain or feed troughs, means stunted growth as the jostling and squeezing does not give some of the chickens a chance. Colds among chickens nearly always result from crowded conditions. There should be enough hoppers to permit all chicks to feed in comfort, and it should be remembered that the chicks are growing rapidly and every week require more room.

RECENT PUBLICATIONS.

THE QUEENSLAND AGRICULTURAL AND PASTORAL HANDBOOK—

Vol. I.—Farm Crops and Pastures . . . . Price, 5s., Post Free

Vol. II.—Horticulture . . . . . Price, 4s., Post Free

BOTANY FOR QUEENSLAND FARMERS . . . . Price, 2s., Post Free

FOR FREE DISTRIBUTION:

Queensland and Its Plant Industry.
Wheat and Maize.
Saccharine Grain and Grass Sorghums.
The Potato.
The Sweet Potato.
Lucerne.
Winter and Spring Fodder Crops.
Common Farm and Pasture Weeds.
Pasture Establishment, Management, and General Improvement.
The Home Vegetable Garden.
Soils, Fertilizers, and Manures.
Farm Bookkeeping.

Enquiries for advisory literature on other subjects would be welcomed.

Because of paper restrictions, inquirers are requested to apply only for the publications they actually need.

All applications for departmental publications should be addressed to **The Under Secretary, Department of Agriculture and Stock, Brisbane.**

ANIMAL HEALTH

Fowl Pox.

L. G. NEWTON.

A HIGHLY infectious disease of poultry, fowl pox, occurs in practically all parts of Queensland where poultry is kept. It is known also as roup, chicken pox, bird pox, contagious epithelioma, diptheritic roup, canker, avian diphtheria, and warts.

Cause and Nature of the Disease.

Fowl pox is caused by a virus—an organism so small that it cannot be seen even with the aid of a microscope.

The lesions of fowl pox are of three different types, the typical and common one being wart-like growths on the unfeathered parts of the head and occasionally the legs. In severe cases they may occur all over the body.

These warts appear first as small blisters, which develop into doughy swellings which in turn become pustules. These break and form yellow crusts which may run together, forming masses which later become brown or black and fall off in about a week.

In cases where the virus invades the lining membrane of the mouth, tongue, and other parts, inflammation is set up with subsequent death of the tissue. Other bacteria enter and as a result large masses of yellowish material called "canker" are produced. These may be so large that the bird is unable to close its mouth; its breathing becomes difficult, the bird is unable to eat and loses condition rapidly. If the canker is removed it leaves a raw bleeding surface on which further deposits are formed.

The canker form of the disease occurs mainly in birds suffering from nutritional deficiency.

The third form which the disease may take is a catarrhal condition involving the eyes and nostrils, causing a watery discharge, which later dries out, becoming thickened and sticky, gumming the eyelids and plugging the nostrils. With blocking of the passages, the head may appear swollen, due to distension of the sinus below the eyes.

Warts appear on some birds in all outbreaks and are a reliable means of diagnosis.

Birds Affected.

Fowls and turkeys are particularly susceptible. Pheasants, water fowl, geese, parrots, pea fowls, and guinea fowls also are susceptible, but outbreaks among them are rare. Pigeons are highly susceptible to a separate strain of virus—pigeon pox virus—but are not ordinarily susceptible to fowl pox.

Outbreaks occur from October to March, and in those areas where the disease is enzootic, *i.e.*, where it occurs every year, young birds from

six weeks old are affected. Mature birds, if they have not developed a natural immunity, also are susceptible. Autumn-hatched chickens may be affected at 2-3 weeks old, a large wart usually appearing at the base of the comb or on the face.

Means of Spread.

Contagion spreads most commonly through injured skin and mucous membranes. Birds are continually pecking and fighting, and in this way wounding the skin of the face and head. The virus is carried over from year to year in particles of dried-out scabs which have lodged in various parts of the pen, and these are conveyed to the abraded skin by the beak or with dust particles, setting up lesions at the site of entry. Infection may also enter abrasions in the lining membranes of the mouth and pharynx caused by rough particles of food.

Insects also help largely in the dissemination of the disease. Mosquitos are well-known carriers, and the fowl tick, lice, flies, and red mites may also transmit the disease.

Effects of the Disease.

If the birds are otherwise in good health, mortality is usually low. Where, however, they are suffering from the effects of parasites, nutritional deficiency, or any other disorder losses may be very high. When young stock are severely affected their growth is retarded and heavy culling is necessary. Heavy losses may occur with autumn-hatched chickens which suffer a generalized infection. If pullets are affected before laying commences they go into moult and production is retarded. Production drops when laying birds are affected, and a considerable period may elapse before they return to production.

Treatment.

Once the disease develops, treatment is of little value except as a means of reducing the spread of the warts and repelling the attacks of insect spreaders. Greasy preparations, such as 10 per cent. carbolic acid in vaseline and lard, are most suitable and should be applied as often as time permits. Canker lesions usually respond to dressing with iodine after removing as much of the mass as possible, and good results may be obtained with the catarrhal form if the head is immersed in 2 per cent. lysol dilution daily. It is usually unwise to persevere with complicated and bad cases and they are better destroyed. The flock should be carefully watched and the food consumption kept up by mixing small wet mashes to which tonics and stimulants have been added.

Prevention.

The disease can be effectively prevented by vaccinating with "fowl pox vaccine." The operation consists of the introduction of a small amount of weakened virus into the skin. The vaccinated bird is thus affected with a very mild attack of the disease, which, in ordinary circumstances, it is able to survive and against which it builds up a resistance sufficient to enable it to withstand a severe natural attack.

Fowl pox vaccine is usually put up in packages containing a small quantity of powder and a quantity of liquid to mix with it. The two should be thoroughly mixed, and where large numbers of birds are to be vaccinated it is better to prepare enough for 50-100 birds, and when this is done to wash and dry the apparatus before preparing more. By

regular cleaning of apparatus possible spread of such diseases as leucosis is minimised. Small amounts of vaccine left over should be destroyed.

Methods of Vaccination.

There are two methods of vaccination—

(*a*) The intra-follicular method in which the vaccine is applied with a brush or swab to a number of feather follicles, preferably of the leg. An attendant takes the bird by the base of the wings and extends the left leg towards the operator. A few large feathers are plucked out and the brush or swab previously moistened in the prepared vaccine rubbed into the follicles. Just sufficient to moisten the follicles is all that is necessary. This method seems to give best results with the vaccine in use in Queensland.

(*b*) The Stab or Stick Method.—With this method a needle with two points about one-twenty-fifth of an inch is used. A piece of waxed cotton wool is twisted around the points, ensuring even depth of penetration. Care should be taken that the needle does not penetrate into the deeper tissues, for if this happens a severe systematic reaction may be set up. The bird is held in the same way as for the intra-follicular method. The feathers are moved away and the skin is pricked with the needle, which has been previously immersed in the vaccine. This method has the advantage that the dosage is even, the tissues are penetrated to the same depth and consequently the result is more uniform. It is more successful with the more concentrated and fully virulent vaccines requiring a small uniform dosage.

If birds are to be vaccinated during the day, they should be confined to pens or crates on the previous night. The operation, however, can be easily done at night and the birds are not disturbed nearly as much as when vaccinated during the day.

Precautions in Vaccination.

It must be emphasized that only healthy birds should be vaccinated. As already stated, the principle of vaccination is based on the fact that a mild attack of the disease is set up. When other diseases are present, the natural resistance of the birds may be lowered to such an extent that they are unable to withstand even this mild reaction and losses or checks in growth occur. Only those birds which are healthy and well nourished, therefore, should be subjected to vaccination.

Vaccination should never be done when—

(*1*) *The presence of any other disease is known* (e.g. *avitaminosis, coccidiosis, &c.*);

(*2*) *Symptoms of internal or external parasitism are in evidence*;

(*3*) *The birds lack vitality or development from earlier attacks of disease* (e.g., *pullorum or coccidiosis*);

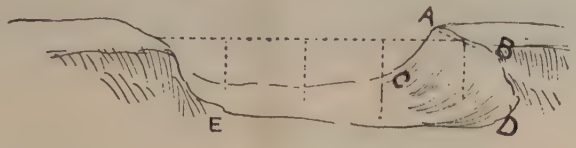
(*4*) *Overcrowding or dirty conditions are present.*

The most suitable age for vaccination is from 6 to 12 weeks. It may be done quite successfully earlier or later, but it has been found to have the least disturbing effect during this period. Moreover, when the birds have reached this age the feathers are well developed and when plucked leave large follicles, which enable efficient vaccination. Younger birds appear to be more susceptible to the systematic reaction, while older birds may be thrown into a false or partial moult, with subsequent retarding of production.

GADGETS AND WRINKLES

WASHAWAYS.

To estimate quantity of earth required to repair washaway of dam.



Rule.—Take mean width of washaway.

Top, A to B, say 20 feet.
Bottom, C to D, say, 40

$60 \div 2 = 30$ mean width.

Take mean depth of washaway by averaging height of the four perpendicular dotted lines, say 20 feet $\times$ 26 $\times$ 30 $\times$ 24 $= 100 \div 4 = 25$ feet mean depth.

Take length of washaway E to D, say 80 feet.

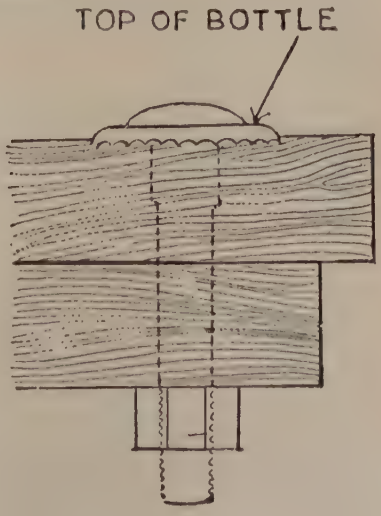
Width $\times$ depth $\times$ length.

$= 30 \times 25 \times 80 = 60{,}000$ cubic feet.

cub. yds. cub. ft.
$60{,}000 \div 27 = 2222 : 6.$

KEEPING BOLTS FIRM.

Nuts have a habit of coming loose, and sometimes even falling off. When they do the bolt often follows. A good way to prevent bolts from working loose and revolving is to drive down on top of them small "crinkled" bottle tops as illustrated. To prevent nuts from loosening, give a good dab of varnish. Another plan is to burr the thread near to nut with a cold chisel.



Mother and Child.

Under this heading an article supplied by the Maternal and Child Welfare Service of the Department of Health and Home Affairs, dealing with the welfare and care of mother and child, is published each month.

HOW ABOUT A FAMILY HEALTH SQUAD!

THERE are many parents who will say "Oh, baby has to have measles or whooping cough or whatever illness is about and so he might as well get it over." This is a dangerous belief and one which may be the cause of loss of life, or, what is almost as bad, a permanent loss of health.

It is true that many of the common infectious diseases are over in a few weeks and it is equally true that one attack often confers immunity as far as the disease itself is concerned, but every illness leaves some trace—whether it be a temporary check to the child's progress, faulty enamelling of the developing teeth or permanent injury to important organs, such as the heart or kidneys.

It is the duty of all parents, fathers as well as mothers, to be aware of the causes and method of spread of infectious diseases and to take every care to protect their children from attacks of these diseases. In fact, every parent should be their family's health officer and in war time when for various reasons the health machinery of the State is over-taxed, this is more than ever important.

The two common causes of disease among babies and young children and which cause many deaths, or, at least, serious ill-health are (1) respiratory infections in which the disease germs exist in the secretions of the mouth, nose, throat and air passages and are conveyed from person to person by coughing, sneezing and in the case of very small children, smearing; and (2) bowel infections in which the disease germs exist in closet pans, garbage of all kinds and manure heaps, and are conveyed to the food by flies or handling.

Swat That Fly!

As a warning has been given that flies will be very troublesome this summer and as the summer is almost upon us, we will consider this month what the "family health officer" must do to prevent infection from this source.

In the first place, all breeding places of the common house fly must be eliminated. If the home is sewered or a septic tank has been installed, there need not be any worry on that score, provided the children are taught clean habits; but if the pan system of disposal of excrement is in use, it is necessary to see that the closet is built so that no excrement can be scattered and flies cannot get into the pan. The regulations of the Department of Health require this and show how an inexpensive sanitary closet can be built in the country.

It is also possible to keep down the number of house flies by preventing them from breeding in manure, garbage, or other decomposing matter. Manure cannot be a breeding medium for houseflies if it spread thinly on a garden or field where it dies quickly. Parents could organise their children into a "health squad" to see that the yard is kept clean and the lid kept tightly on the rubbish tin and so on. If it is explained to them why this is being done, they will be so much more interested. It takes about ten days for a fly's eggs to hatch, so even a once-weekly clean-up will help.

Cleanliness in the House.

It is most important that food, particularly milk, is clean and does not touch any unclean dish or human hand. A person who is handling food—and very expecially food for babies—should thoroughly wash the hands first. Keep all milk clean, cool and well covered. Make covers from two thicknesses of old curtain or mosquito net and put over the bread, meat, and other food on the table. Butter, jam and cheese should be kept in covered dishes. Keep a fly swatter handy and be ruthless in destroying the pest which walks on all kinds of filth and then on to food.

Where there is a baby in the house a covered bucket should be provided for his napkins, and the mother should wash her hands immediately she "changes" the baby. Parents should teach their children habits of cleanliness. So, in spite of the war, the protection of children's health should not be left to others. Hence, it would be wise to organise the family health squad without delay.

In the meantime, questions on this or any other subject concerning maternal and child welfare will be answered by communicating personally with the *Maternal and Child Welfare Information Bureau*, 184 St. Paul's Terrace, Brisbane, or by addressing letters "*Baby Clinic, Brisbane.*" These letters need not be stamped.

IN THE FARM KITCHEN.

Some Unusual Recipes.

In present circumstances, recommendations are subject, of course, to the availability of the ingredients mentioned or of suitable substitutes.

Bean Fritters.

Put ¾ cup self-raising flour into a basin, break in 1 egg and beat in, adding about ½ cup milk until a smooth batter is obtained; add about a tablespoon grated cheese, pinch salt, and ½ cup cooked French beans. Fry in boiling fat.

Meat Savoury.

Mince the left-over beef or mutton together with an onion and mix it with a little gravy, meat extract, or vegetable water. Place half of the mixture in a piedish, cover it with sliced tomatoes, seasoned to taste, then add the rest of the meat and another layer of tomatoes. Dot with butter and sprinkle with breadcrumbs. Bake in a medium oven till brown.

Liver Breakfast Dish.

Boil gently ½ lb. liver till cooked (about ¾ hour), drain and chop finely and put into bowl with 2 oz. chopped (cooked) bacon, add pepper, salt, and pinch of mixed herbs, and add a little milk. Mix well, put into saucepan and stir over gentle heat till very hot, but do not let it boil. Serve on hot dish.

Non-Ration Pie.

Take 4 fried sausages, skin, and shred in a piedish, cut 2 large onions fine, put on top of sausages, add a little salt and pepper, then cover with tomato sauce. Now cover with a crust of mashed potatoes, smooth on top, mark with a fork. Put 3 or 4 little bits of gravy dripping on top. Bake a nice, golden-brown. Serve with green vegetables.

ASTRONOMICAL DATA FOR QUEENSLAND.

NOVEMBER.

TIMES OF SUNRISE AND SUNSET.

At Brisbane.			CORRECTION IN MINUTES FOR OTHER PLACES.					
Date.	Rise.	Set.	Place.	Rise.	Set.	Place.	Rise.	Set.
	a.m.	p.m.						
1	4·59	6·5	Cairns	+ 45	+ 12	Longreach ..	+ 42	+ 28
6	4.55	6.9	Charleville ..	+ 29	+ 25	Quilpie	+ 33	+ 37
11	4.52	6.12	Cloncurry ..	+ 61	+ 38	Rockhampton ..	+ 17	+ 3
16	4.50	6.16	Cunnamulla ..	+ 28	+ 30	Roma	+ 19	+ 15
21	4.48	6.20	Dirranbandi ..	+ 17	+ 21	Townsville	+ 38	+ 12
26	4.47	6.24	Emerald	+ 26	+ 13	Winton	+ 49	+ 31
30	4.46	6.27	Hughenden ..	+ 46	+ 24	Warwick	+ 3	+ 6

TIMES OF MOONRISE AND MOONSET.

At Brisbane.		
Date.	Rise.	Set.
	p.m.	a.m.
1	6.50	5.27
2	7.56	6.12
3	8.59	7.00
4	9.59	7.51
5	10.54	8.44
6	11·43	9.39
7	..	10.34
	a.m.	
8	12.27	11·29
		p.m.
9	1.07	12.22
10	1.43	1.14
11	2·16	2.06
12	2·48	2.57
13	3.20	3.49
14	3.52	4.22
15	4.25	5.35
16	5.01	6.31
17	5·41	7.27
18	6.25	8.24
19	7·14	9.21
20	8.07	10.15
21	9.05	11.06
22	10.07	11.54
23	11.09	..
	p.m.	a.m.
24	12.12	12.38
25	1·16	1.18
26	2·20	1.59
27	3.24	2.38
28	4.29	3.19
29	5.34	4.01
30	6.39	4.47

CORRECTION IN MINUTES FOR SOUTHERN DISTRICTS.

Charleville + 27; Cunnamulla + 29; Dirranbandi + 19;
Quilpie + 35; Roma + 17; Warwick + 4.

CORRECTIONS IN MINUTES FOR CENTRAL DISTRICT.

Date.	Emerald.		Longreach.		Rockhampton.		Winton.	
	Rise.	Set.	Rise.	Set.	Rise.	Set.	Rise.	Set.
1	+ 14	+ 23	+ 29	+ 39	+ 4	+ 14	+ 33	+ 44
6	+ 12	+ 27	+ 28	+ 43	+ 2	+ 18	+ 31	+ 49
11	+ 16	+ 22	+ 32	+ 37	+ 7	+ 12	+ 36	+ 42
16	+ 25	+ 14	+ 41	+ 29	+ 16	+ 4	+ 47	+ 33
21	+ 27	+ 12	+ 43	+ 27	+ 18	+ 2	+ 50	+ 30
26	+ 19	+ 18	+ 35	+ 34	+ 10	+ 9	+ 40	+ 38
30	+ 12	+ 26	+ 28	+ 42	+ 2	+ 16	+ 31	+ 47

CORRECTIONS IN MINUTES FOR NORTHERN DISTRICTS.

Date.	Cairns.		Cloncurry.		Hughenden.		Townsville.	
	Rise.	Set.	Rise.	Set.	Rise.	Set.	Rise.	Set.
1	+ 16	+ 39	+ 41	+ 56	+ 27	+ 41	+ 14	+ 33
3	+ 11	+ 46	+ 38	+ 62	+ 23	+ 47	+ 10	+ 39
5	+ 9	+ 49	+ 37	+ 64	+ 22	+ 48	+ 8	+ 41
7	+ 12	+ 47	+ 38	+ 62	+ 23	+ 47	+ 10	+ 40
9	+ 15	+ 41	+ 40	+ 58	+ 26	+ 43	+ 13	+ 35
11	+ 22	+ 34	+ 45	+ 54	+ 31	+ 38	+ 19	+ 29
13	+ 29	+ 26	+ 50	+ 48	+ 35	+ 33	+ 25	+ 22
15	+ 38	+ 18	+ 56	+ 43	+ 42	+ 28	+ 33	+ 16
17	+ 45	+ 11	+ 61	+ 38	+ 45	+ 23	+ 37	+ 11
19	+ 50	+ 8	+ 64	+ 36	+ 48	+ 22	+ 41	+ 8
21	+ 49	+ 10	+ 64	+ 38	+ 48	+ 23	+ 40	+ 10
23	+ 43	+ 17	+ 60	+ 42	+ 44	+ 27	+ 36	+ 16
25	+ 34	+ 21	+ 53	+ 45	+ 39	+ 30	+ 30	+ 19
27	+ 24	+ 32	+ 47	+ 52	+ 32	+ 37	+ 21	+ 27
30	+ 12	+ 44	+ 38	+ 60	+ 24	+ 45	+ 11	+ 37

NOTE.—The plus sign (+) means later than Brisbane time.

PHASES OF THE MOON.

Last Quarter, 8th November, 4.28 a.m.; New Moon, 16th November, 8.29 a.m.; First Quarter, 23rd November, 5.53 p.m.; Full Moon, 30th November, 10.52 a.m.

DISCUSSION.

On 21st November, the Sun rises 20 degrees south of true east and sets 20 degrees south of true west. On 26th November, the Moon rises true east.

Venus.—Throughout the month, this planet will still be visible in the western sky during the early evening. At the beginning of November, in the constellation of Ophiuchus, it sets, in Queensland generally, about 9 o'clock, approximately 25 degrees south of true west. About the middle of the month, it passes into the constellation of Sagittarius and reaches its maximum declination south, setting about 27 degrees south of true west. The angle south of true west at setting will then begin to decrease until February next year, when Venus will have a declination of 0 degrees and will rise and set true east and true west respectively. By the end of November this planet, sets about 25 degrees south of west, about 9.30 p.m.

Mars.—Mars is still too close in line with the Sun to be observed. On 14th November it will be exactly in line with the Sun and earth, but on the opposite side of the sun to the earth.

Jupiter.—At the beginning of the month in the constellation of Leo, Jupiter will be a brilliant object in the eastern sky during early morning, rising near 3 a.m., 5 degrees north of true east. By the end of the month, this planet passes into the constellation of Virgo, and in Queensland rises between 1 a.m. and 1.30 a.m.

Saturn.—In Queensland, in the early part of the month, Saturn rises between 10.30 and 11 p.m. in the constellation of Gemini, about 23 degrees north of true east. By the end of the month it rises between 8.30 p.m. and 9 p.m., still 23 degrees north of true east.

True and Magnetic Directions.—Last month, the true direction at rising and setting of the Sun, Moon, planets and stars was discussed. Now will be considered the difference between true direction and magnetic, or compass direction, this difference being known as magnetic declination. If we are told a star rises true east, it will be found that at Brisbane (providing there is no local magnetic attraction) the compass direction of that star's rising will be 81 degrees or 9 degrees north of magnetic east (90 degrees). Again from Brisbane an object which has a bearing of 9 degrees east of true north, by the compass reads 0 degrees, or magnetic north exactly. If a cross be made to represent true north, south, east and west, and on the centre of this cross another cross to represent magnetic N., S., E., and W., is drawn or pivoted so that its north points 9 degrees to the east of true north, then the relation between magnetic and true direction of the cardinal points is easily seen. Now instead of the terms north, south, east and west, use degrees, *i.e.* 0 degrees (N), 90 degrees (E), 180 degrees (S) and 270 degrees (W). There is then a 90 degrees true and a 90 degrees magnetic, and a 0 and 180 degrees true and a 0 and 180 degrees magnetic. It will be observed that the arm representing 90 degrees true corresponds to the direction 81 degrees (90-9) on the magnetic scale, and that 180 degrees true corresponds to 171 degrees magnetic. Where the magnetic declination is east then, magnetic bearing is found from true bearing by subtracting the magnetic declination. Where the magnetic declination is west, however, magnetic bearing is found from true bearing by adding the magnetic declination. Throughout Queensland, the magnetic declination is always east, its value, however, changes as follows:—Brisbane 9 degrees east; Cairns 6 degrees east; Charleville 7 degrees east; Cloncurry 5½ degrees east; Cunnamulla 7½ degrees east; Emerald 7½ degrees east; Hughenden 6 degrees east; Longreach 6½ degrees east; Quilpie 7 degrees east; Rockhampton 8 degrees east; Roma 8 degrees east; Townsville 6½ degrees east; Winton 6 degrees east. Lines on a chart which join places of equal magnetic declination are know as Isogonic lines. In Queensland these lines run in a general north east-south west direction.

Supplied by the Astronomical Society of Queensland.

QUEENSLAND WEATHER IN OCTOBER.

Rainfall totals were well under average throughout the State except at very isolated stations. Rain in the south-east districts, accompanied by local thunder, occurred in the early part of the month. The relief effects of August rains are now diminishing; although some districts were in fair condition general falls throughout all agricultural and dairying areas in the State were needed. With an estimated crop of 6,000,000 bushels almost ready for harvesting the continuous dry weather was an advantage to grain growers. Most inland pastoral areas had carried through on the general rains of last February, but early storms to replenish pastures and surface water supplies were needed.

Temperatures.—Average maximum temperatures ranged from approximately 1 to 3 degrees below normal except at Thargomindah, plus 1 degree, and Stanthorpe plus 2 degrees. Minimum figures also were from 1 to approximately 6 degrees below normal, except in the South-West, Thargomindah plus 4 degrees. Daily maximum readings over 100 degrees were recorded in the West 12-15th (102 degrees, Thargomindah on 14th and 15th).

Some frosts occurred on the Downs Highlands.

The rain position is summarised below—

Division.	Normal Mean.	Mean October 1944.	Departure from Normal.
	Points.	Points.	Per cent.
Peninsula North	45	19	58 below
Peninsula South	70	3	96 ,,
Lower Carpentaria	52	11	79 ,,
Upper Carpentaria	76	13	83 ,,
North Coast, Barron	133	89	33 ,,
North Coast, Herbert	178	134	25 ,,
Central Coast, East	129	29	78 ,,
Central Coast, West	77	71	8 ,,
Central Highlands	146	32	78 ,,
Central Lowlands	98	19	81 ,,
Upper Western	60	12	80 ,,
Lower Western	71	26	63 ,,
South Coast, Port Curtis	208	80	62 ,,
South Coast, Moreton	274	133	51 ,,
Darling Downs East	223	87	61 ,,
Darling Downs West	165	64	61 ,,
Maranoa	161	63	61 ,,
Warrego	110	20	81 ,,
Far South-West	86	Nil	100 ,,

Commonwealth Meteorological Bureau, Brisbane.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

SEPTEMBER RAINFALL.

(Compiled from Telegraphic Reports).

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Sept.	No. of years' records.	Sept., 1944.	Sept., 1943.		Sept.	No. of years' records.	Sept., 1944.	Sept., 1943.
North Coast.	In.		In.	In.	*South Coast—contd.*	In.		In.	In.
Atherton	0·74	42	2·30	1·83	Gatton College ..	1·43	44	1·36	2·04
Cairns	1·65	61	4·48	1·65	Gayndah	1·47	72	0·56	2·21
Cardwell	1·47	71	1·18	1·73	Gympie	2·02	73	1·77	5·08
Cooktown	0·56	67	1·90	1·37	Kilkivan	1·61	62	1·11	3·39
Herberton	0·55	57	1·20	0·93	Maryborough ..	1·84	72	1·26	2·02
Ingham	1·51	51	2·56	3·61	Nambour	2·26	47	3·00	6·34
Innisfail	3·52	62	5·88	4·03	Nanango	1·71	61	0·74	2·55
Mossman	1·93	19	3·42	3·82	Rockhampton ..	1·22	72	0·74	2·11
Townsville	0·50	72	0·05	1·75	Woodford	2·04	55	1·45	2·93
Central Coast.					*Central Highlands.*				
Ayr	1·21	56	..	1·28	Clermont	0·95	72	0·07	3·00
Bowen	0·77	72	0·09	0·50	Springsure	1·22	74	0·60	2·22
Charters Towers ..	0·75	61	..	2·91					
Mackay	1·60	72	0·75	4·23	*Darling Downs.*				
Proserpine	1·89	40	2·30	1·46	Dalby	1·61	73	1·70	1·96
St. Lawrence ..	1·19	72	1·08	2·82	Emu Vale	1·66	47	1·48	3·28
					Jimbour	1·52	64	1·47	1·56
South Coast.					Miles	1·26	58	1·62	3·17
Biggenden	1·38	44	1·00	1·56	Stanthorpe	2·19	70	1·12	4·08
Bundaberg	1·48	60	0·81	2·42	Toowoomba	2·01	71	1·75	2·86
Brisbane	1·93	91	1·49	3·94	Warwick	1·75	78	1·30	2·37
Caboolture	1·76	67	1·91	4·39					
Childers	1·64	48	1·58	2·20	*Maranoa.*				
Crohamhurst	2·49	50	..	5·65	St. George	1·03	62	0·76	1·12
Esk	1·94	56	1·29	2·08	Roma	1·32	69	1·80	5·26

CLIMATOLOGICAL TABLE FOR SEPTEMBER.

Compiled from Telegraphic Reports.

Divisions and Stations.	Atmospheric Pressure. Mean at 9 a.m.	Shade Temperature.		Extremes of Shade Temperature.				Rainfall.	
		Mean Max.	Mean Min.	Max.	Date.	Min.	Date.	Total.	Wet Days.
Coastal.	In.	Deg.	Deg.	Deg.		Deg.		Points.	
Cairns	..	80	64	85	5	57	2, 3	448	16
Herberton	..	72	53	84	4, 16	44	4	120	11
Townsville	..	80	62	85	2	54	18	5	2
Brisbane	30·22	72	55	81	15	48	12	149	11
Darling Downs.									
Dalby	..	74	47	86	1	33	12	170	3
Stanthorpe	..	67	40	74	22	27	12	112	4
Toowoomba	..	67	49	80	1	38	18	175	6
Mid-Interior.									
Georgetown	30·01	89	61	99	25	52	1	..	..
Longreach	30·16	87	58	99	30	41	17	8	2
Mitchell	30·22	75	45	86	14	33	18	66	3
Western.									
Burketown	..	87	64	91	3, 4, 10	57	6, 17	..	..
Boulia	30·04	88	59	97	13, 14	43	17, 18	49	1
Thargomindah	30·16	80	55	91	13	44	17, 18	..	..

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Commonwealth of Australia,
Meteorological Bureau, Brisbane.